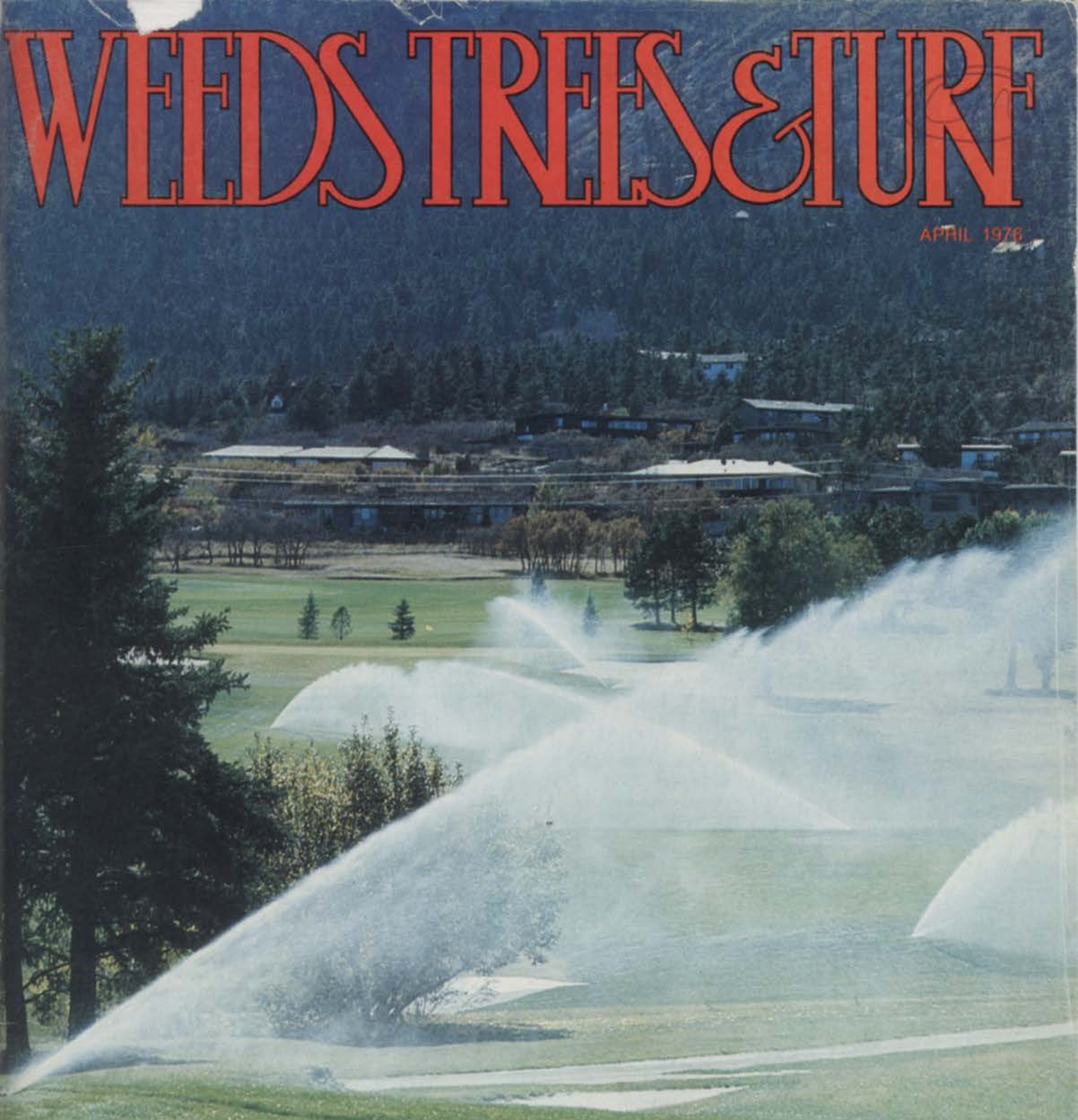
WEEDS TREES & TURF

APRIL 1976



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WEEDS TREES & TURF®

April 1976, Vol. 15, No. 4

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THE COVER—Broadmoor Golf Club, Colorado Springs, Colo. utilizes a Toro irrigation system.

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Editorial

There will be an overwhelming and paralyzing increase in government regulations of all aspects of weed control, not only in the use of herbicides but in alternate methods as well, according to Dr. Boysie E. Day, professor of plant physiology, University of California at Berkeley. He spoke at the Southern Weed Science Society Meeting earlier this year in Dallas, and we share some of his thoughts here.

An increasing burden of regulatory busy work is today necessary to get a new product registered and this is a deterrent to the development of research workers . . . The national policy on pesticides is to progressively accumulate all significant decisions about pesticides into government hands . . . Greater government control over herbicides will not better the human safety factor because the hazard in weed control has always been associated almost entirely with machines, and regulatory activities are not aimed at alleviating these hazards . . . For greater effectiveness, procedures of weed control must be adapted to local and regional conditions, and this will never be done on a national scale . . . The effect of restricting herbicide use leads to switching from one chemical to another less efficient one which in the end leads to larger doses, not reduction in use of herbicides . . . $71.5 million will be spent to support the Environmental Protection Agency pesticide program through next March, and this money would be more judiciously spent on research.

Dr. Day's summary is that in the future the regulators will join with the regulated to defend procedures they have established and gained vested interest in. By that time, the staggering costs of regulation will have pruned the industry down to a comfortable half-dozen international companies, and the academic community and other agencies will have been successfully isolated from the decision-making processes. Pesticides will then have become in effect public utilities moving with glacial slowness without a harsh word spoken. All decisions will be made with a minimum of publicity by quiet negotiations between government and corporate bureacracies on the basis of unpublished industry research.

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Government News·Business

The Environmental Protection Agency has postponed to June 30 the effective date of the recent ban on further production of most pesticides containing mercury. Administrator Russell Train delayed the effective date of the ban at the request of several producers of mercurial pesticides. The ban originally was effective February 17. The producers reportedly asked for the delay to allow federal courts time to rule on several lawsuits challenging the ban.

More light-duty trucks are to be subject to tighter emission standards under new proposals by the Environmental Protection Agency. The number of pick-up trucks, vans, utility vehicles and off-road vehicles that must meet federal exhaust emission limits will increase by over 50 percent in 1978 under the proposal. In addition, the emission standards for these trucks would be reduced to levels comparable in stringency to those scheduled for 1977 cars.

Building awards rose in January to $6.39 billion -- a 25 percent leap from a year earlier, which is good news for sod growers and others related to the turf and green industry. Residential building contracts rose 40 percent in January to $2.16 billion. Also, it appears home mortgage rates may be a bit better this spring. The reason is that thrift institutions are loaded with money to lend. As a result, many real estate experts expect to see mortgage rates dropping at least a quarter percentage point and perhaps a half-point by the time spring house buying gets into full swing. However, any rate downturn may be temporary. Many mortgage lenders see rates inching back up later this year.

Another increase in the minimum wage is coming fast. This time Congress will tie the wage standard to a formula assuring automatic increases from now on. The most likely outcome of informal committee sessions is the wage floor, which rose from $2 to $2.30 an hour in January, will be hiked possible to $2.75. Also, the floor will be indexed to provide automatic boosts. Despite Ford Administration opposition, the bill will move fast. The Senate Labor Committee is already primed to act quickly once the House legislation is passed.

The U. S. Department of Agriculture has issued a full registration to Charles R. Freers of Muscatine, Iowa for his chemical treatment for the prevention and arrest of Dutch elm disease to the states of Missouri, Iowa, Illinois and Indiana. Freers said he expects other states will be registered for his product soon.

According to latest figures published by the Bureau of Mines, sales of horticultural perlite grew 19 percent in 1974. Usage increased from about 21,180 short tons in 1973 to 25,370 short tons in 1974. The two-year growth for sales is about 100 percent.

Labeling for Aquazine algicide, a selective chemical that controls nuisance algae and submerged weeds in ponds without affecting all groups of algae or higher plants in the aquatic environment, has been registered by the Environmental Protection Agency according to manufacturer, Ciba-Geigy Corp., Greensboro, N. C. The algicide is a photosynthesis inhibitor thus making it safe to non-photosynthetic organisms including zooplankters, fish and other aquatic animal life.

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HOW TO HANDLE A WATER SHORTAGE

You would think the exclusive, internationally known Valley Club of Montecito, Calif. would not have a problem in the world. At least not a serious one. It has what must be one of California's most beautiful golf courses, which lies along the gently rolling foothills of the Coast Range very near the Pacific Ocean. Clusters of magnificent oaks and sycamores line the undulating fairways of the 100-acre course, which is modeled after St. Andrews of Scotland. The Valley Club course is never crowded, its 350 members being well-to-do, influential people who insist on privacy and the freedom to play golf far from crowds.

The rich rural community of Montecito which adjoins Santa Barbara enjoys one of the most favorable climates in the country. Coastal moisture, plus cooling summer fogs and an average of 17 inches of rainfall annually. When the temperature reaches 80 to 85 degrees, Montecito's residents imagine they are having a hot spell.

This idyllic countryside does have a problem, one shared by the Valley Club and the community of Montecito. Both are suffering from a sudden shortage of water, a moisture famine that is likely to become more severe. Water is rationed. Violators face fines and even jail terms. At present homes cannot be built in the area, which is served by the Cashuma Dam reservoir to the west. The region has been developing rapidly and there is heavy use of water for agriculture.

Golf superintendent Don Lokey of Valley Club is facing the problem head-on. He saw the possibility of a water shortage more than two years ago while planning a new irrigation system for the course.

"We asked that the design of our new system include the ability to cut back to meet such a shortage," he recalls. "But we didn't think it would come this quickly."

Now Lokey has been handed the not entirely welcome opportunity to test his theory that "golf courses in general get too much water." He will try to find out how little water he can get by with without having bad looking turf. The research project should be of considerable interest to golf superintendents everywhere.

Lokey's first step is calibrating all parts of his new irrigation system so that he will be able to control accurately its water output and can link the output accurately to the meter reading. He must know this, he emphasizes, in order to learn how little water he can use to maintain his green golfing pastures. Among the devices he is using to get his answers are calibrated cups, like rain gauges.

Lokey, who originally was an ornamental horticulturalist and became a golf superintendent by accident, has an engineering turn of mind. He came to Valley Club more than three years ago to help plan the new irrigation system. The decision to replace a golf course irrigation system is a major one. But it wasn't too difficult to make in this case. The old, patched-up system was wearing out and getting too unwieldy.

It had been installed in 1929 and was designed on the old principle, Lokey recalled, "that you watered only tees, landing areas just before the greens, and the greens. There was very little sprinkler coverage and you relied a lot on the coastal dampness."

As it became necessary to water more and more of the course, including the fairways, extensions were added to the old cast iron pipe system. All kinds of sprinkler heads were used. Gardeners worked night and day to maintain watering schedules. Labor and water costs mounted. Then came early warnings of a possible water shortage. A new, much more efficient irrigation system became mandatory.

"To get the accuracy in the system that we considered necessary," Lokey said, "we asked all manufac-

A battery of rotor pop-ups operating on the sixth fairway at Valley Club in Montecito, Calif. Each fairway has its own separate automatic controller.

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turers we felt were reputable to send us samples of their sprinkler heads. We said we'd like to test them.

"We took each head and set it at the manufacturer's recommended pressure. Then we took a vessel, turned the head upside down in it, got a stopwatch, and turned on the water to the recommended pressure. We watched to see how many gallons came out.

"One of the heads missed its mark by 25 percent! How can a design engineer for an irrigation system take those specs and be successful?

"From the tests," he said, "we selected our system. The selection was based on the performance of the company's head. It produced the amount of water it was supposed to."

Then the company was given the task of designing the irrigation system. It was decided that 1,228 sprinklers would be required to adequately cover the course. There was much discussion over how far apart to space them. This is interpreted as the irrigation ratio. Common but poor installations have ratios as high as five to one Lokey said. This means that for every inch of water you put on the dry spots, in a typical pattern of four sprinklers, you must put five inches on the rest of the turf. Many systems are four to one, which is not much better.

Valley Club superintendent Don Lokey testing moisture level with a moisture sensing instrument to determine water required for the next irrigation cycle.

The ideal, according to Lokey, is one-and-a-half to one. But that's about impossible to achieve with the present design standards. The new system at Valley Club is two to one. A group of four sprinkler heads farms corners of a rectangle 60 by 70 feet on a side.

Lokey would like the spacings to have been closer than 60 by 70 feet, but he acknowledges that his two to one system is surprisingly effective.

The Formost Construction Company of Venice, California, contracted to install the new system and was able to do so without shutting the course down. Plastic pipes were laid throughout, the largest mains being eight inches in diameter and the smallest, four. The pipe was laid three feet deep. Some of the digging was rugged. Many rocks had to be removed.

The new system was designed by Rain Bird Sprinkler Mfg. Corp., Glendora, Calif. to irrigate more than 100 acres of turf. Pressure is maintained by a booster pump with a capacity of 1,350 gallons per minute. It is expected to boost 75 psi water from the main Cachuma line to 105 psi, but Lokey admitted he has not yet achieved this goal.

When the rationing program was instigated after the new irrigation system had been installed, it sounded at first as if the Valley Club would be getting a generous allotment of water. The amount was to be based on the amount of water used over the years. This turned out to be less than bountiful. The meter on the old system had been faulty. And, as Lokey explained, when water meters go awry, they don't give you less water than they record, but most often much more.

Thus the Valley Club historically used more water than it is now allowed — which is 200 acre feet a year. It's apportioned into three-

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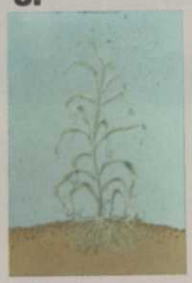

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month blocks that cannot be carried over. If they could, Lokey is certain he could work more effectively with the rationing schedule.

"I sympathize with the water department," he declared. "We'd voluntarily curtail our present amount of water rather than let the community run short — even though it's painful. And it is painful."

Lokey and his club committees have taken the rationing philosophically.

"We've had shortages before and survived them," he said. "And we can do it again. During one shortage only the tees and greens were watered."

Lokey is convinced that with the new, more efficient irrigation system and tensiometers he can make it. He has the advantages of humidity, little evaporation, and a variety of fairway grasses that have been allowed to grow and mingle as they wish — bluegrass, bent and Bermudas. They grow in Montecito beautifully. There also is some native annual bluegrass that does very well. The greens are all of seaside bent; they were planted forty years ago. The grasses don't require heavy watering because of the mild climate.

After it was installed, Lokey began calibrating the new system immediately so that the water output would agree with the meter reading. He makes daily checks of the amount of water used.

"We're coming pretty close to knowing how much water we're putting on," he commented. "Our rain gauge-like calibration cups are helping."

As far as depth of watering, Lokey isn't interested in getting it eight inches deep. His turf doesn't have roots down there. But he is interested in three inches, and wants to keep things moist at least to that depth. The Montecito soil is good at holding moisture, unlike the sandy soils of many desert golf courses.

At present, the watering periods are two cycles of 20 minutes each every other night. The whole course gets this amount, which in summer is about .84 of an inch a week.

"I can go our right now and find a dry spot, put tensiometers on it and get virtually zero," Lokey says.

Clubhouse complex at Valley Club in Montecito, Calif.

"On a couple of them now I'm getting five centibars. I can get along beautifully with 20."

There are indications that he can reduce his water. But he doesn't want to cut back to the point where he's creating dry spots.

"On the average course where you find a dry spot, you just turn up more water," he said. "That's just a cover-up."

To make certain he stays well within his ration quota, Lokey has turned off sprinklers at the edge of fairways and in the roughs. Of the total of 1,228 sprinklers, he has cut off 286, explaining: "I'd rather have an area completely dead and try to balance the rest of the system so the parts that are watered look good."

As for the course's many great trees, they do better without watering. In fact, over-watering the course fosters the growth of fungus at the base of the tree trunks. Lokey's men are careful to keep the base of the trees as dry as possible.

"All courses have dry spots," Lokey said. "And when the greens committee jumps on a superintendent for this, he turns on more water. That ends the dry spots for a time, but it over-waters the course. Pretty soon you're standing with mud on one leg and dust on the other. The big problems are underpressure of water and over-spacing of sprinkler heads."

The spacing of heads of the key to a successful irrigation system, according to Lokey.

Many system designers will space the heads too far apart so that they can bid a lower price for the system. It's the competitive thing.

He thinks golf management is willing to pay a higher price for well-spaced heads if the sales people would explain to them that they would save in the long run on water and labor. Clubs don't want to have to try to cover up for a poor system by over-watering. The original cost of additional sprinklers and pipe is soon made up in savings in water. And where water is scarce, there is additional incentive for an efficient water system because it saves water. The irrigation equipment is excellent and can perform much better with well planned installations.

Lokey thinks the locations of sprinkler heads should be determined with transits, instruments that civil engineers use. This isn't done. The common practice is to line up the sprinkler sites with the eye and plant flags on the selected sites. Sprinkler heads located by that method invariably are off by a few feet and that can upset the pattern, he said.

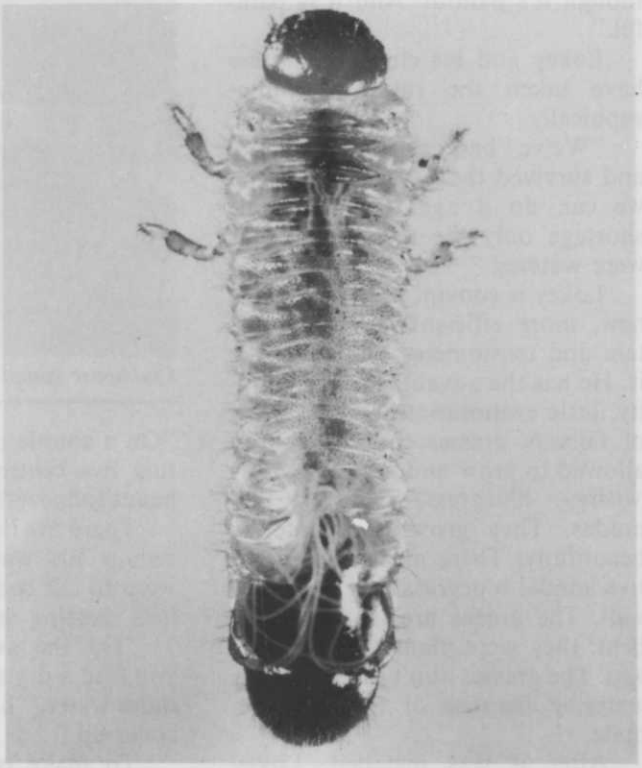
One thing appears certain. The Valley Club's irrigation system will be one of the most efficient in the country when Lokey completes his research project. And not many systems will be as well understood. □

Japanese Beetle Parasite Found in the Northeast

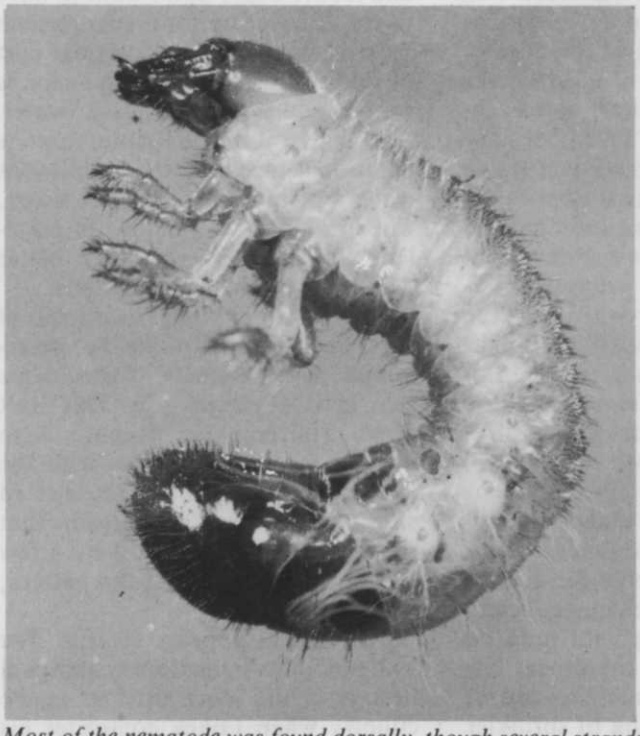
As was reported in the January news section of WEEDS TREES & TURF, a new nematode parasite has been discovered in the Northeast. The parasite is being studied as another possible natural method to control the insect. Since the January report pictures of the parasite attacking the larvae of the beetle have been taken at the U.S. Agriculture Department's Japanese Beetle Laboratory at the Ohio Agricultural Research and Development Center in Wooster, and the pictures are published on this page.

Apparently, Japanese beetle larvae become infected by the merimithids in late summer. Laboratory entomologist M. G. Kelin said the merimithids emerged in March from larvae collected in October and held in cold storage until January. Parasites emerged in mid-May from larvae collected in April.

The thread-like merimithids, about nine inches long, could be observed coiled inside the collected larvae. At the time of emergence, individual grubs showed little sign of life except feeble movement of the mouthparts. A single merimithid normally emerged from each grub, although as many as three parasites were recovered from one host. Most of the host larvae had completed their third moult when the merimithids emerged.



The merimithids, about nine inches long, could easily be observed coiled inside the larvae since they extended from the middle region to the second-last abdominal segment.



Most of the nematode was found dorsally, though several strands were visible on the ventral side.

The merimithids emerged either through the intersegmental membrane of the first body joint of the legs or through the mouth of the larvae.

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LEAF SPOT on bentgrass (melting-out stage).

LARGE BROWN PATCH (Rhizoctonia solani).

TYPHULA BLIGHT or Gray Snow Mold, close-up view.

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How Mowing Affects Turf

The effects of mowing (height, frequency and equipment adjustment) on turfgrasses are usually detrimental. The results are reduced roots, rhizomes, carbohydrate storage and increased succulence. Aesthetic quality however, improves because of increased shoot density if height is lowered within the tolerance range of the species. Mowing is necessary to maintain a groomed appearance. Use of the turf dictates mowing management. Successful turf managers adequately compromise the physiological status of the plant with the demands of the clientele utilizing the facility.

Cutting height. Cutting height can be defined as the distance above the soil surface at which the turf is clipped. Turfgrasses vary in their tolerance to cutting height. Growth habit and location of leaf primordia dictate the height at which a species will best respond. Bentgrasses, for example, have leaf primordia located near the soil surface, while the primordia of tall fescue are about one inch above the soil.

Cultivars of the same grass also exhibit different tolerance to height of cut. The improved cultivars of Kentucky bluegrass (Pennstar, Merion, Fylking, Baron and many others) tolerate closer mowing than Delta, Kenblue and Newport. Although the location of leaf primordia is a partial explanation, leaf angle is probably more important in explaining these cultivar differences. Improved cultivars have leaves that, once they are fully expanded, are almost parallel to the soil surface. During mowing, these leaves are clipped only a slight amount each time and consequently they are able to maintain photosynthesis on a unit area basis and continue to produce carbohydrates. This minimizes the utilization of reserve carbohydrate for new leaf growth and allows root and rhizome growth to continue. By contrast, when cultivars that have upright leaves are mowed closely, little leaf area remains and utilization of reserve carbohydrate is required to produce new leaves. While these new leaves are being produced the photosynthesis per unit area is reduced as is root growth. Turf resistance to environmental stresses (particularly drought and heat) is closely related to carbohydrate status and root growth.

Cutting height, frequency and mower adjustment are interrelated for the care of fine turf.

By Thomas L. Watschke
Associate Professor
Turfgrass Science
Penn State University

The top to root ratio of all turfgrasses is altered as the height of cut is lowered. The closer the cutting height is to the soil surface, the shorter the root system becomes. A foliar priority for reserve carbohydrate is the most commonly cited reason for the decline in roots. Clipping may also affect the concentration and translocation of root growth regulators that are synthesized in leaves.

Rhizome and stolon growth do not have as direct a relationship with defoliation as root growth. A lowering of cutting height within the tolerance range for a given species can actually increase growth of vegetative propagules. For example, it is a common practice to mow closely during the early establishment of creeping bentgrass to increase stolon growth. Kentucky bluegrass and creeping red fescue have rhizomes that provide a source of new plants when the turf becomes injured. Continued close mowing can reduce rhizome production and reduce overall sod strength. This can lead to poor footing which can cause serious problems, particularly on athletic fields.

Succulence of turfgrasses can be increased when the cutting height is lowered. A succulent condition, combined with reduced rooting places the plant in a weakened condition. Resistance to stress and disease attack thus becomes lowered at a time of the year when turfgrass pathogens are most active. Consequently, the severity of turf diseases is increased for a given plant species when it is maintained at the lower end of its clipping tolerance range. Increased succulence of tissue also increases the demand on the root system for adequate moisture to maintain turgidity. Therefore, wilting occurs more readily when turf is clipped closely. The simultaneous conditions of reduced rooting and increased succulence requires intensive irrigation management to maintain turfgrass quality.

Some turfgrasses, particularly low growing types like the bentgrasses and Bermudagrasses can be adversely affected when the cutting height is too high. Puffiness and thatch accumulation often occur which diminishes turf quality, returning these low growing turfs to their propeer height must take place over a farily long period of time to avoid scalping.

Not all effects of mowing are deleterious. Closer mowing within the tolerance range of a species can stimulate tillering and consequently increase shoot density. Increased density improves appearance, provides a more playable turf, and is a positive response to mowing. This response is positive only as long as the height is still within the tolerance range for the species. This phenomenon often becomes an important management tool to manipulate plant competition. Tall fescue competition can be reduced in a Kentucky bluegrass stand if the mowing height is lowered to near the limit of the bluegrass tolerance. This may be particularly valid when accomplished just prior to winter.

Another example of the effects of mowing on plant competition would be a mixed stand of Kentucky bluegrass and annual bluegrass. When mowed closely, *Poa annua* will increase in shoot density, while Kentucky bluegrasses will decrease. Although the Kentucky bluegrass will continue to produce

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rhizomes, the *Poa annua* will maintain a competitive advantage above the ground.

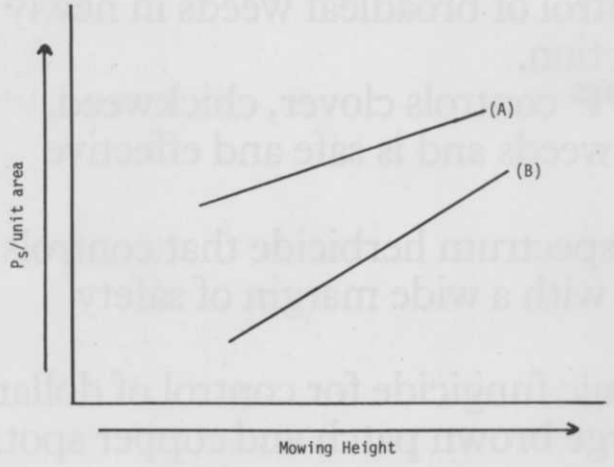
Leaf texture is also affected by mowing. Unclipped turf of any species has wider leaf blades than when it has been mowed. In general, the closer the mowing the finer the texture. Finer texture is desirable in most cases. The fine textured leaves of close clipped bentgrasses have better putting quality than would the leaves of unclipped bentgrass. Annual bluegrass leaves become quite fine textured when mowed at putting green height. High cut turf has wide leaves which provides good light interception. However, since closer mowing can increase the number of shoots per unit area, any disadvantage associated with reduced width would be offset.

Frequency. Frequency and cutting height are interrelated. Generally, as the mowing height is lowered, frequency must be increased to maintain quality. Mowing frequency is primarily dictated by shoot growth rate.

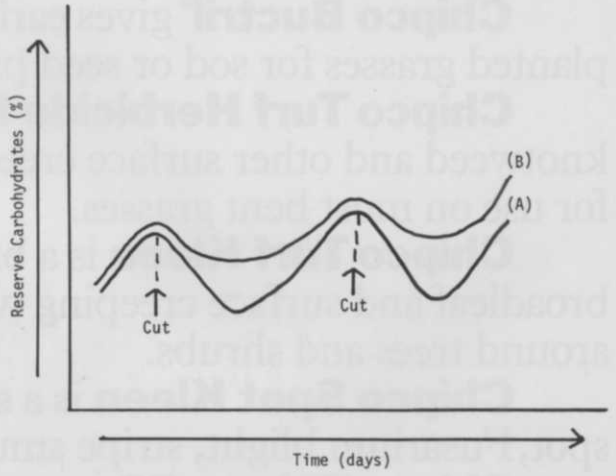
To avoid scalping, the frequency must increase when growth rate increases. As a general rule, no more than one-third of the foliage should be removed. When frequency does not change commensurate with an increased shoot growth rate, each mowing will remove an excessive amount of leaf tissue. The plant is then given an unnecessary physiological shock. Defoliation of three-fourths of the leaves can result in almost complete root growth stoppage for as long as two weeks. Reserve carbohydrates are translocated and utilized for new shoot growth. With severe scalping, root growth not only stops, sometimes there can be considerable root death. When this occurs, the turf stand will not tolerate stresses and is more disease susceptible.

Turfgrasses vary considerably in their shoot growth rate. Tall fescue and ryegrasses can have a rate nearly three times more rapid than bentgrass. Frequency, however, is usually increased on the bentgrass because of the closeness of cut, particularly on golf greens. Nitrogen fertility greatly increases the shoot growth of all turfgrasses. At times changes in the nitrogen fertility program can manipulate plant growth rate and affect mowing frequency.

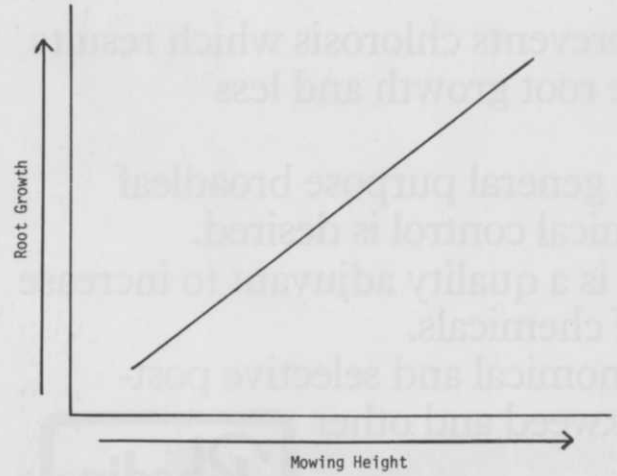
Generally, the effects that mowing frequency have on turf are the same as those previously cited for mowing height. When mowing fre-



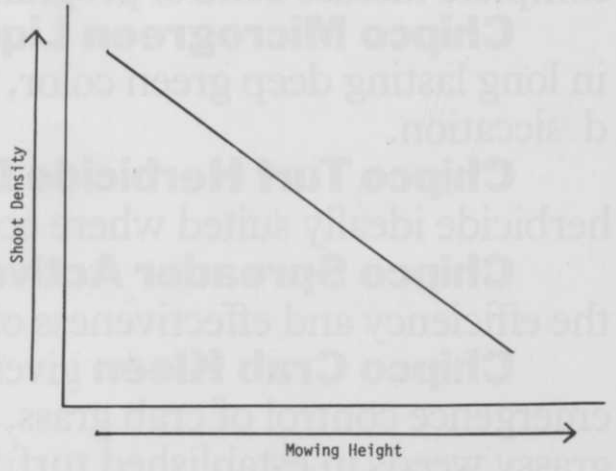
The effects of mowing on the photosynthesis (Ps) per unit area of upright type Kentucky bluegrasses (A) compared to those more decumbent (B).



The effect of close mowing on reserve carbohydrate depletion in upright (A) and decumbent-type Kentucky bluegrasses (B).



The effect of mowing height on root growth.

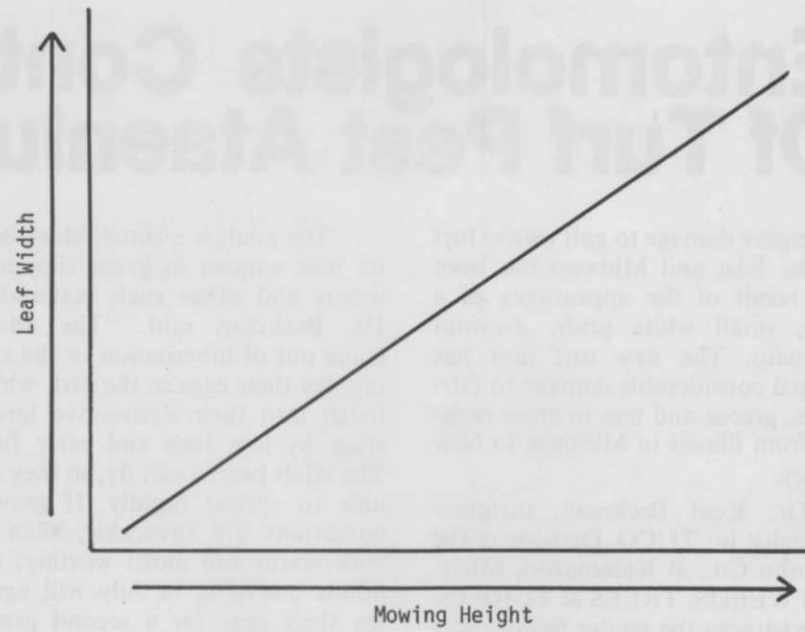


The effect of mowing height (in the tolerance range for a species) on shoot density.

quency is increased, the shoot growth rate will usually decrease. The advantage of this reduced shoot growth rate with more frequent defoliation is that the amount of leaf removed each mowing is small, and the clippings will fall down through the leaf canopy. This can eliminate the necessity of catching clippings. These small pieces of leaf clippings are approximately 70 percent water and easily decomposed compounds. Consequently, decomposition occurs rapidly and only contributes a small amount to thatch.

Mower adjustment. Adjustment for rotary mowers only refers to blade sharpness. Dull rotary mower blades tend to shred grass leaves rather than cut them. The fiber content of the vascular system (veins) is high and resists cutting, and consequently will shred. A severe reduction in aesthetic quality will result because the exposed shredded veins dehydrate and turn brown. These bruised, shredded leaves are not only unattractive, but provide points of entry for pathogens.

Reel-type mowers that are not sharp can result in a "banding" of leaf blades which districts from the appearance. Reel mowers that are sharp, but out of adjustment, do not cut cleanly, leaving a ragged edge. Misadjustment can also result in "rippling" of the overall canopy which is unattractive wven though the cut may be satisfactory. Turf that has a high leaf fiber content (ryegrasses and tall fescue) must be cut with sharp, properly adjusted equipment to insure optimum appearance. □



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Entomologists Continue Study Of Turf Pest Ataenius Spretulus

Extensive damage to golf course turf in the East and Midwest has been the result of the appearance of a new, small white grub, *Ataenius spretulus*. The new turf pest has caused considerable damage to fairways, greens and tees in areas ranging from Illinois to Michigan to New Jersey.

Dr. Kent Beckman, turfgrass specialist for TUCO, Division of the Upjohn Co., at Kalamazoo, Mich., told WEEDS, TREES & TURF the grub attacks the tender feeder roots of grass and usually works about a half-inch below the soil surface. "Damage first appears as localized dry spots," he said. "And many turf managers have made the mistake of irrigating the dry-appearing areas without investigating below the soil surface."

Dr. Beckman received his B.S. in forestry at the University of Washington, and his Ph.D. at Oregon State University majoring in biology, plant pathology and biochemistry. He has been involved in turf research for 12 years.

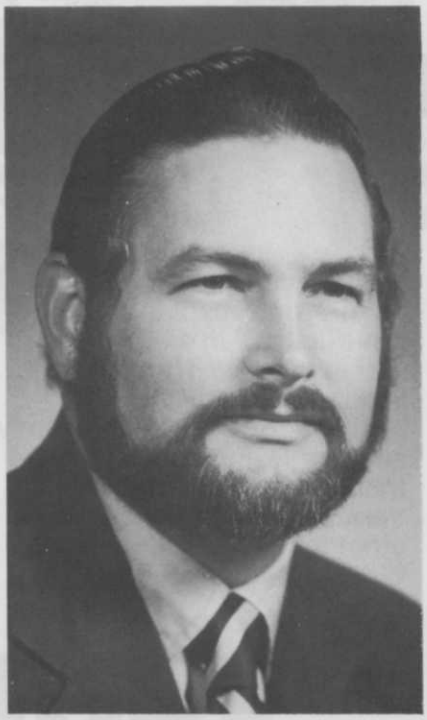
The grub pest particularly likes *Poa* and bentgrass turf, although it has been found in bluegrass and other grass species, he said.

He said the grub has probably existed in some areas before, but was usually identified as something else. He says particularly during the last three or four years that which was described as dry spots may have in reality been the results of the *Ataenius* grub. The grub's sudden wide-spread appearance was attributed largely to ideal weather conditions and a general lack of insecticide programs on fairways and cutbacks in other areas due to economic strains. Entomologists are currently studying the new pest in an effort to learn more about it. Turf conference programs recently have had many programs on the grub, and research on the grub is currently in the process of being funded.

"The adult is a small, black beetle that winters in grass clippings, debris and other such materials," Dr. Beckman said. "The adults come out of hibernation in the spring, lay their eggs in the turf, which hatch into their destructive larvae stage by late June and early July. The adult beetles can fly, so they are able to spread rapidly. If growth conditions are favorable, such as with warm and moist weather, the adults emerging in July will again lay their eggs for a second generation to follow in August."

He said the tiny, white grub is about the same thickness and length of a sharpened pencil lead. He adds that it also has a brownish head and a dark posterior like that of more common white grubs.

"Damage may first appear to be turfgrass wilting about the size of a golf ball which can spread to cover several square yards," he said. "And although it only takes about 30 grubs per square foot to begin damaging turf, as many as 50 per square inch have been found." Early control is important and special care must be made to insure a complete kill as resistance to various insecticides has been observed.



Dr. Beckman

"Damage from the grub appears in July or August, so one should begin looking for the pest in three-day intervals during the middle to latter part of June," he said. "If a dry-appearing area is spotted, positive identification can be made by pulling up small patches of turf. Turf that has been invaded by the tiny grub will peel back like carpet, he said, and the grubs can be seen working from the soil surface through the first half-inch of the soil."

Because the grub has demonstrated a resistance to some insecticides, control in some areas has been erratic.

"High populations of the grub have been found in areas that had been previously treated with dieldrin, heptachlor and chlordane," he said. "Resistance to these cyclodiene insecticides has been found on courses in Ohio, Connecticut, New York and New Jersey."

"One of the best materials available for controlling the pest is Proxol 80 SP," Dr. Beckman said. "It is essential to get the chemical through layers of thatch to where the grubs are working in order to obtain control of white grubs and the mini-grubs are no exception. Water will carry the material down to the grubs which explains why water-soluble products have proven so effective."

He said the chemical should be applied at 3¾ ounce per 1,000 square feet, or equivalent per acre, either early in the morning or late afternoon, followed by thorough irrigation of the turf which carries the material down to the grub feeding zone. He advises inspection 12 to 24 hours following chemical applications to insure that desired levels of control were obtained. □

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He Treats Trees Like People

Jimmy J. Harrod Sr., who owns and operates C & H Tree Experts in Fort Worth, Texas, is a warm-hearted, down-to-earth arboriculturalist who treats trees and plants like they were people.

One of the few people still around today who believe a handshake is as good as a contract, Harrod punctuates his almost constant dialogue with colloquialisms that will sometime hit you between the eyes like a migraine. He will tell you, for instance, that the best way to get rid of bag worms is "with a hammer and sidewalk," but he will further explain the proper sprays to use if you prefer.

Harrod has worked in a supermarket, operated a root beer stand, washed dishes, sold tobacco, and been a sky diver and a personnel consultant. He got his first taste of arboriculture while attending the University of Heidelberg as a foreign exchange student. He started out by taking general courses just to get an education. It was during his sophomore year that Harrod met the forest master of Germany's Black Forest.

"This old man knew those trees just like they were his kids," Harrod told WEEDS, TREES & TURF. "When they had a wind storm, they got someone out there raking leaves and cleaning it up. It is really a cared-for place." But it was not until some years later when he met who was to be his future partner in business that he realized there was money to made treating trees.

'Why aren't you in the tree business? You have the education for it, and you can sell a row boat to a desert rat.'

"I got to talking to this guy one day and he started putting his terminology on me. I just talked back in the same language. He said, "Why aren't you in the tree business? You have the education for it, and you can sell a row boat to a desert rat." So a partnership was formed six years ago. Harrod since has acquired all interest in the company.

"I sold nearly everything I owned to buy equipment, spending it for chains, saws, ropes, spurs, climbing gear and insurance," he said. "I even sold my wife's Volkswagen." Today, his equipment is worth around $60,000, including trucks, chippers, a company car, two different spray rigs, a jeep, $3,000 worth of chain saws, and $1,000 in hand saws. At times he has had as many as 15 men working for him. "The personnel factor is one of the biggest problems there is. If I had the key people I could get more business than I could take care of. A lot of guys are going out of business because they can't get help.

"But they have to do it my way," he said. "There is a proper way to do the work. Some people leave brush in the yard or stuff in behind shrubs. We don't do that. If we take it off, we rake that yard when we are through. If the chipper makes a mess in the street, we sweep the street up."

Harrod attends professional conferences "just to pick the minds

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Cement, divided with felt soaked in creosote, fills about five feet of the main trunk of this old oak tree. Harrod says the tree has been healing for about 25 years.

of the older members who have been in trees so long they are bent over like gorillas." He said, "I like to find out what they did way back when there wasn't all the modern equipment and chemicals around to combat disease of trees. I like just listening to them." And he makes good use of the information obtained from these conferences.

Harrod attends professional conferences 'to pick the minds of the older members who have been in trees so long they are bent over like gorillas.'

Harrod's concern today is for the consumer. "The consumer is getting ripped off by the so-called garden supply centers around the country," he said. He feels there are no competent employes in these centers to give proper advice to the consumer with a garden problem. "If you go into a discount center and look at the quality of plants and ask pertinent questions about certain diseases, see if you can get an answer. If you buy a spray, take it home and apply it and it doesn't work, the tendency is to go back and buy something else. No one can explain proper sprays or methods at these places," he said.

One problem encountered by Harrod is when he sprays a tree, the customer expects the trees or plants to be free of insects for the entire year.

"With the rains we had last year, for example, that is impossible" he said. "They want us to come out and spray one time, and they they want us to come back and spray 10 times more for free. We cannot do that. You need to spray from three to eight times a year, with normal weather."

Some clients expect Harrod to come out to their homes with a one-shot solution that is going to make a tree that has been dead three weeks come back to life. "And we cannot do that. On the other hand, some call me in time to save a tree, but they want to know if I can guarantee that I can save the tree. That is just like asking a doctor if he can guarantee saving a life."

He does not claim to be a miracle-worker. "I know my limitations," he said. "All I want is to have the best service available to people who really have a problem — to go out and do all I know — prune their trees properly, feed them properly and shape them." He says he may not have all the solutions to plant problems, but if he doesn't, you can bet he knows where to go to get the right answers. "I want to retire knowing that I have done the best I could have possibly done," he said. □

Colloquialisms that hit you between the eyes like a migraine — the best way to get rid of bag worms is 'with a hammer and a sidewalk.'

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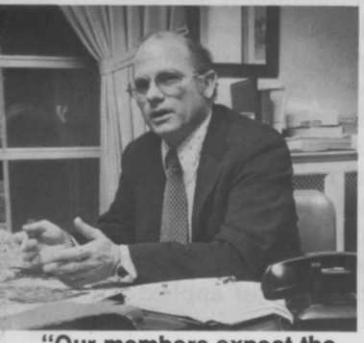

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Fertilizing Economically

Soil condition, environmental conditions, management program and turfgrass requirements are as important as cost per unit of fertilizer.

By Dr. James A. McAfee
Texas Agricultural Extension Service
Renner, Texas

When discussing the economics of a fertilizer program, we usually spend most of our time talking about cost per unit of fertilizer. While this is an important point, there are several other factors which affect the economics of your fertilizer program. Factors such as soil condition, environmental conditions, management program, turfgrass requirement, etc., will all have a large effect on how efficiently your fertilizer is being used. This is one of the major points I would like to cover — getting the most efficient use of the fertilizer applied. Learning to combine the best buy cost wise along with maximum efficiency is what every turf manager should strive for.

The chemical, physical, and available nutrient level of the soil in which the turfgrass is grown will have a large effect on your fertilizer program. Of the soil chemical factors, soil pH (soil reaction) will play a big role in how efficiently the applied fertilizer is being used by the plants. Soil pH is a term used to express the acidity or alkalinity of the soil. A pH of 7.0 is considered neutral, while anything below 7.0 acid and anything above 7.0 alkaline. Soil pH is expressed in logarithms. What this means is that a pH of 6.0 is ten times as acid as a pH of 7.0 and pH of 5.0 is one hundred times as acid as a pH of 7.0. This is why it is so important that the pH is not allowed to become highly acidic. At this point, it takes considerably more time and limestone to neutralize the soil. (Amount of lime applied to adjust pH should always be based on results of soil tests. Most states have facilities for conducting these tests.)

Acidic or alkaline soil conditions affect nutrient uptake in many ways. Under acidic soil conditions, much of the phosphorus in the soil is unavailable for plant use. The phosphorus ion forms highly insoluble complexes with iron and aluminum ion which cannot be absorbed by the plant. Root growth, especially root hairs, is greatly limited under acidic conditions. This reduces the amount of roots for nutrient uptake. Acid soils leads to thatch build-up. Activity of microorganisms which break down thatch is reduced under acid soil conditions.

Under both alkaline and acid soil conditions, the activity of soil microorganisms which are involved in nitrification, ammonification, nitrogen fixation, and other nutrient transformations are reduced. This includes release of nitrogen from ureaformaldehyde as well as the organic complexes in the soil.

A good means of illustrating the effect of soil pH on fertilizer efficiency is the following example: At a pH of 5.0, 33% of N-P-K in a complete fertilizer is not available for plant use. At a cost of $180 per ton for the complete fertilizer, 33% of the money spent or $59 per ton is wasted. By simply maintaining the soil pH at correct level, this waste can be greatly reduced.

Physical condition of the soil will also have an effect on nutrient absorption by the turfgrass. Root growth is restricted under soil compaction. Some nutrients, especially phosphorus, are very immobile in the soil. Roots have to intercept these ions and with restricted root growth, chances of intercepting a phosphorus ions is reduced.

Waterlogged and/or compacted soils reduce plant respiration. Nutrient uptake is an energy process and plant respiration is necessary to produce the energy required for nutrient uptake. Therefore, under waterlogged or compacted soil conditions, efficiency of fertilizer use is reduced because of restricted root growth and reduced plant respiration. Provision for proper soil drainage and good cultivation practices (aerification) can thus help to increase efficient use of applied fertilizer.

Another means for more efficient use of fertilizers is by selecting the proper fertilizer analysis for your area. The fertility level for N-P-K will vary for different soils. Research has found that more turfgrass plants used on golf courses grow best at N-P-K ratio of 3-1-2 to 4-1-2. Application of supplemental nutrients should be based on supplying this ratio to the plants. Also, if soil tests indicate high to very high

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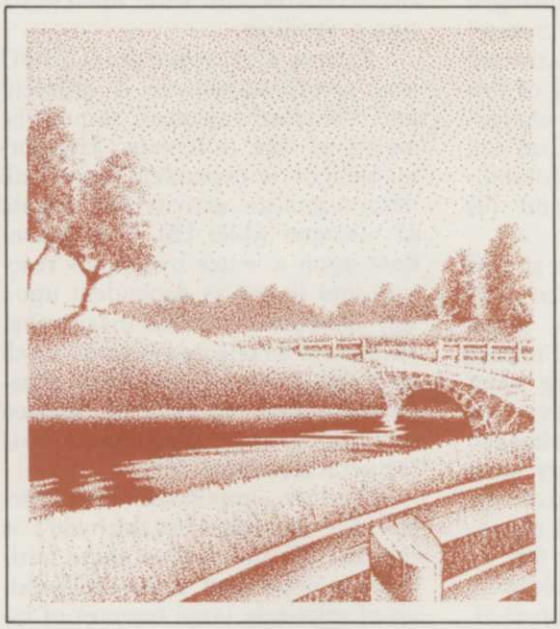

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levels of phosphorus and potassium on those areas where clippings are not removed, then nitrogen only may be applied. Thus by determining soil fertility level through soil tests, a turf manager may be able to save money on purchase of his fertilizers. All fertility programs should be based on results of soil tests. The difference in cost for supplying 4.0 lbs. per 1,000 sq. ft. on fairways for 18 hole golf course using ammonium nitrate vs. 18-18-18 at present prices is approximately $1,300. If soil levels of phosphorus and potassium are high, this money could be saved or diverted to another project.

A turf manager should be aware of the different types of fertilizer carriers available and how they work. This is especially true for the three nitrogen carriers. These carriers work differently and to obtain the most efficient use of them, a turf manager must be aware of their characteristics.

First class of nitrogen carrier is the inorganic nitrogen carriers. Two examples of this type of fertilizer are ammonium nitrate and ammonium sulfate.

Important characteristics of this type nitrogen carrier are: (a) high water solubility, (b) rapid response, (c) high foliar burn potential, (d) short response, and (e) less cost per unit N.

Application of large amounts of these fertilizers should be avoided on soils high in sand content. This could lead to a high degree of leaching. However, under most fairway conditions, loss of nitrogen due to leaching is reduced considerably. Also, application of these fertilizers should be avoided when leaves are wet or on hot humid days. These fertilizers should always be watered in thoroughly after application to reduce the chance of foliar burn.

Due to the short response period, lighter and more frequent applications of these fertilizers will be required. While labor costs will be higher for these type nitrogen fertilizers (more applications), the lower cost per unit N will more than offset this difference. The difference between ureaformaldehyde vs. ammonium nitrate at 4.0 lbs. per 1,000 sq. ft. on bermudagrass fairways for 18 hole golf course is approximately $3,000. Research has shown that with proper application of ammonium nitrate the same quality turf can be grown with the synthetic organic or natural organic fertilizers.

The second source of nitrogen carriers used on turf is the natural organic nitrogen carriers. Activated sewage sludge is an example of this type of carrier. Some of its characteristics are: (a) dependence on soil temperature, (b) low water solubility, (c) medium release, and (d) higher cost per unit of N.

These fertilizers need a soil temperature above 55° for soil microorganism activity to break down organic complex and release the nitrogen. In early spring when Bermudagrass needs nitrogen for early growth, release of nitrogen from these fertilizers is very slow due to reduced microorganism activity in the soil. These soil microorganism are most active at 90°.

With the low water solubility and reduced foliar burn potential, larger amounts of fertilizer can be applied per application. The response period for these fertilizers is intermediate between the inorganic carriers and the synthetic organic carriers. However, under high soil temperatures, nitrogen can be released at a fairly high rate by some of the natural organic carriers. Over application of these materials in summer months could lead to excess growth problems.

The third class of nitrogen carriers used on turf is the synthetic organic nitrogen carriers. There are basically two kinds: (a) primarily water-soluble, and (b) primarily water-insoluble. An example of water soluble synthetic organic nitrogen carrier is urea. This carrier reacts much like the synthetic inorganic nitrogen carrier. Ureaformaldehyde and IBDU are examples of the primarily water insoluble carrier. These compounds are considered slow release nitrogen sources.

Fertilizers containing ureaformaldehyde and IBDU are what we often refer to as specialized fertilizers for use in high maintenance turf. These fertilizers were developed after many years of research and offer several advantages. Some of these advantages are: (a) reduced risk of foliar burn, (b) better spreadability, (c) less fire hazard, and (d) longer residual response. While the cost per unit N is much higher for these fertilizers, advantages listed above must be taken into consideration when selecting a fertilizer.

Release of nitrogen from IBDU and ureaformaldehyde is different and the turf manager should be aware of this difference. Ureaformaldehyde is dependent upon soil microorganism activity for release of nitrogen while IBDU is dependent upon a water hydrolysis reaction and is not as dependent upon soil temperature. This means that IBDU will be released in cold as well as warm temperatures while ureaformaldehyde will only be released during warm weather, soil temperature above 55°.

Another important characteristic for the ureaformaldehyde's is that the effective use of these fertilizers is dependent upon the buildup of relatively large reserves of insoluble nitrogen in the soil. To get maximum use of these fertilizers may require several years of application.

Selecting the proper fertilizer for use will depend on several factors. Turfgrass quality desired, environmental conditons, cost, cultural practices, and growth rate desired will all influence the turf manager's choice. He must be aware of the different characteristics for fertilizer carriers in order to obtain maximum efficiency from his applications. In most cases, more than one type of nitrogen carrier is used. Maximum fertilizer efficiency will depend on using the proper fertilizer carrier, at the correct rate, and when needed by the plants. As one can visualize, this is not an easy task.

Listed below are three important factors for providing a sound, economical fertilizer program:

(1) Provision of good chemical and soil conditions for proper nutrient uptake by plants.
(2) Awareness of the different fertilizer carriers and how to use them properly.
(3) Applying supplemental fertilizer at the correct ratio, rate and time. □

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"We guarantee our work for the whole growing season and automatic follow-up checks are done to see how well the spraying treatment did," explains Earl Antes, co-owner with John Woronick.

The firm specializes in commercial industrial spraying such as railroad yards, railroad rights-of-way, oil tank farms, and inventory areas.

"We have found many firms try to do their own spraying with poorly trained personnel," states Antes. "Sometimes they don't even know what material they have been using. They will often show us a half-empty drum with a skull and crossbones painted on it but don't have the slightest idea what is inside."

Antes believes companies are just now becoming interested in having professionals handle their spraying needs on a year-to-year basis under contract. He says OSHA as well as environmental concerns seem to be encouraging this interest.

For the first year and a half of employment, Weeds, Inc., employees are considered to be under training. After that, they can accept major responsibility for their work and require less supervision. "We employ our people full-time, year-around," explains Antes. "Seasonal or part-time help means more risk because your personnel won't have the necessary training to do a trustworthy job. We want to provide the best possible service, fully guaranteeing our work, and it takes well-trained people to achieve this."

Though Weeds, Inc., has a sales staff, the basis for the rapid growth of the company is referrals. "We have plans to expand into the South and are already doing some work in Florida," says Antes.

"Companies find out about us from other companies, so the word is spread and our business just keeps growing." Some of the Weeds, Inc., employees are both salesmen and applicators. They sell during the winter months and operate teh spraying units during the growing season.

Antes said the firm is getting very good results with a relatively new non-selective herbicide. "It is consistent and very reliable. We think it is the best thing for Johnsongrass and other deep-rooted perennials. Before using this new herbicide, the firm relied heavily on various systemic herbicide combinations to control perennial growth. Antes said the herbicide does an excellent job of eliminating problem perennial weeds either before or after soil sterilants are applied. He said by using the herbicide on perennials, follow-up treatments have virtually been eliminated.

He said the initial per gallon cost is higher than other chemicals but that at the rate it is used it is more economical on a per acre basis. "Other chemicals were costing us $125 to $130 per acre to control Johnsongrass," says Antes, "But this herbicide's cost is only about $55 to $65 per acre."

Antes says his firm has never had any problems with application or safety. "It is a reliable and consistent product which we appreciate because of the guarantee we have on our service." Its low level of toxicity makes it much less hazardous to humans and animals than many other weed control materials.

Roundup, Monsanto Co., is cleared for non-agricultural or industrial uses for 2 years. It can be used on non-crop areas such as railroad, pipeline, highway, power and telephone rights-of-ways; petroleum tank farms and pumping sites; roadsides, storage areas, fence rows, manufacturing plant sites; parking areas; airports; and other similar uses. It will control many annual grasses and broadleaf weeds at the rate of one to 1 ½ quarts in 20 to 30 gallons of water per acre as a broadcast spray. It will control may perennial grasses and broadleaf weeds at the rate of two to four quarts in 20 to 30 gallons of water per acre as a broadcast spray, the company told WEEDS TREES & TURF. □

JOHN DEERE MAKES TRACTORS FOR JOBS OF ALL SIZES. BECAUSE YOU CAN MAKE MONEY ON JOBS OF ALL SIZES.

There's no such thing as a tractor that's right for any size job. If it's big enough for golf course maintenance, it's probably too big for most residential work.

That's why John Deere Tractors come in a wide range of sizes. So you can have John Deere performance and dependability going for you on any job.

Take the new John Deere 2040. It has a 40*-hp diesel engine, 8-speed constant-mesh transmission, and plenty of hydraulic power to handle any attachment you might need. Including a 6-foot, center-mounted rotary mower. The 2040 was designed to do the big jobs faster and easier.

For work that doesn't require a tractor as big as the 2040, there's the hydrostatic-drive John Deere 400. It's powered by a twin-cylinder, 19.9-hp engine. And there's a 5-foot, center-mounted rotary mower that's designed to match the 400.

To do small jobs economically and efficiently, John Deere offers you the 200 Series lawn and garden tractors. You can choose from 8-, 10-, 12-, and 14-hp models, all with variable-speed drive to change ground speed without stopping or shifting gears. Rotary mowers are available in either 38- or 46-inch widths.

With any size John Deere Tractor, you also get the John Deere tradition of expert service, parts availability and flexible financing.

For any job that comes along —big, small or in-between—John Deere has a way to do it. Profitably.

**Maximum PTO horsepower measured at 2,500 engine rpm (factory observed).*

NOTHING RUNS LIKE A DEERE®

JOHN DEERE

Circle 132 on free information card

Merchandising Is the Key For Fresno Custom Applicator

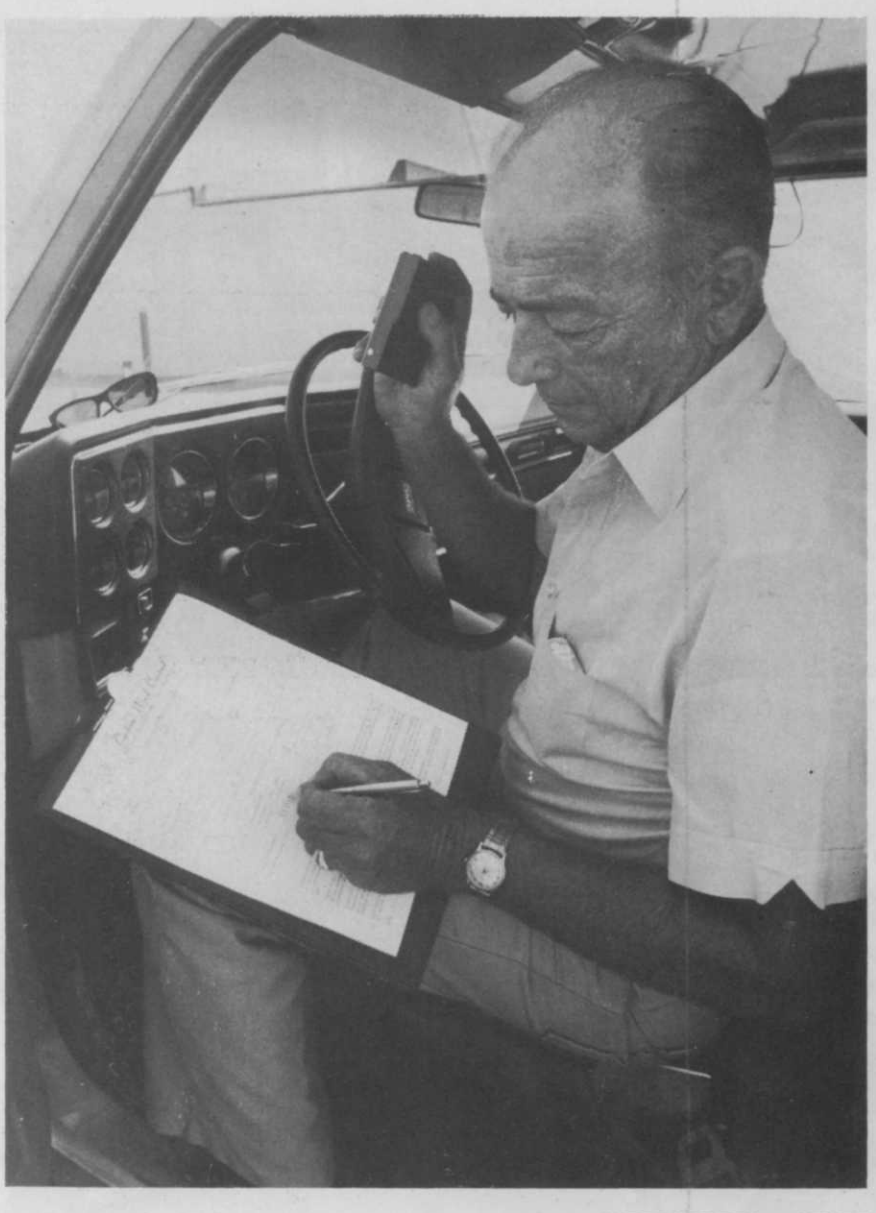
Tom Heffernan, owner of Custom Weed Control in Fresno, Calif., specializes in solving weed control problems for business and industrial concerns. He leases all spray applicator equipment, buys his own chemicals and even does his own bookkeeping. He believes in keeping a close watch over every aspect of his year-old firm, and utilizes some unique merchandising ideas to get and maintain business.

Heffernan started first by sending out a mailer to over 1,000 potential customers in a four-county area around Fresno. He got a very reespectable 12 percent return, with over half of the leads becoming his first customers.

Since then, Custom Weed Control signs erected on completed projects have resulted in a call a week from each sign, but most important, his satisfied customers have been talking up the results they have seen with Heffernan's services.

A good example of how Heffernan works is the case of a new customer, Dunrite Manufacturing Company in Fresno. Dunrite, a light industrial manufacturing firm located in the sprawling urbanized area, had been trying to comply with city government requests to rid a patch of expansion-area acreage of unsightly weeds.

Russian thistle, lambsquarters, puncturevine and numerous other weeds and grasses had been infecting the troublesome area. So, when



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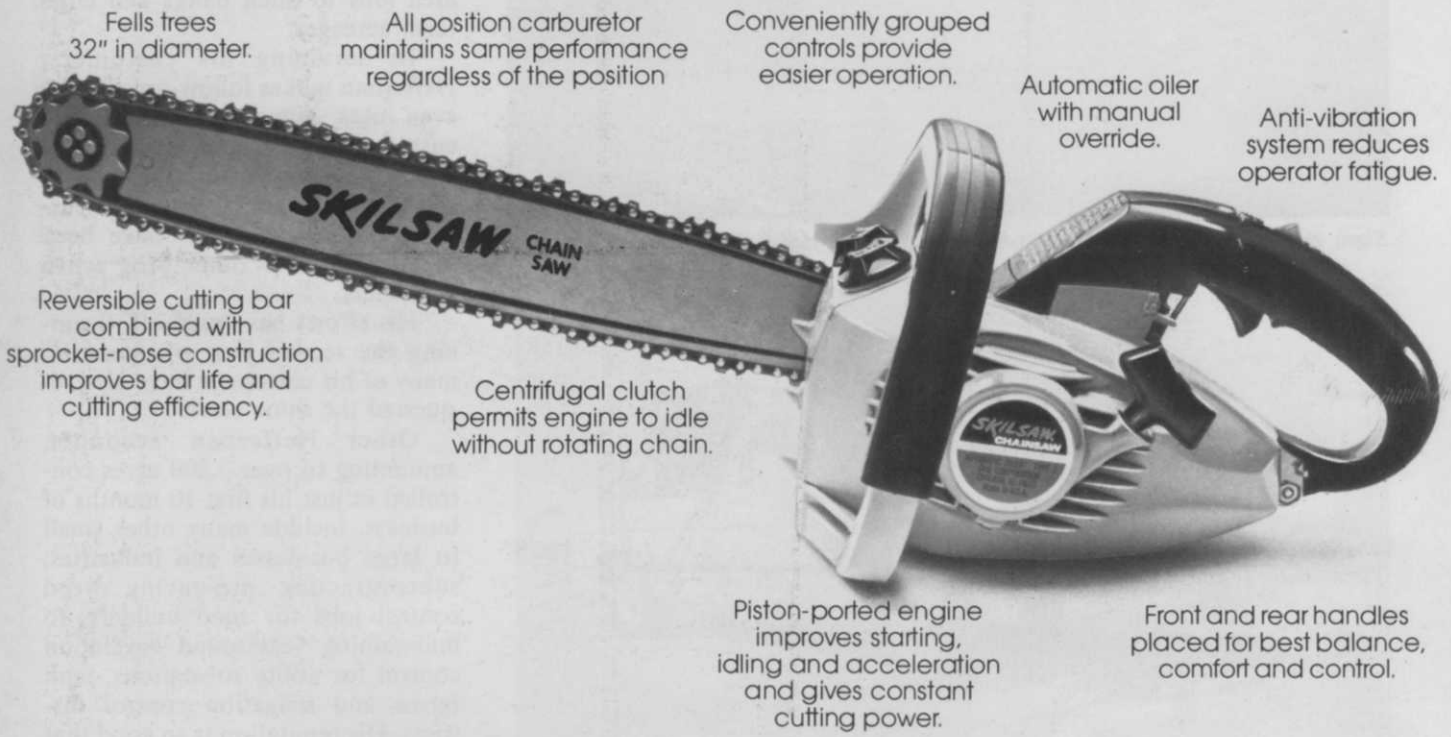


This lightweight can really cut it.

Here's a genuine lightweight chain saw that comes up with the muscle a professional needs. It'll slice through underbrush, knock down 32" trees and cut logs fast and easy. This lightweight Skil will handle just about any cutting job that comes your way.

When it comes to having all those features that get the job done fast, it's a heavyweight. Packed with extra value. Durable, too—it keeps working all day, every day. This is the power-packed lightweight that should be working for you and your crews!

SKIL®

1616 Chain Saw. The powerful lightweight.

Signs erected on completed projects have resulted in a call a week from each sign.

Heffernan has his ¾-ton pick-up rig equipped with a 320-gallon fiberglass tank, drift-control nozzles with remote controls, a brush nozzle attachment giving him a 35-foot swath with hydraulically controlled booms mounted on the front.

W.I.N. with NITROFORM® and save!

W.I.N. with Nitroform® nitrogen . . . and save! On time turf is out of play.

Corenco bags it!

HERCULES INCORPORATED
Turf and Horticultural Products
Wilmington, Delaware 19899

STH76-7B

Circle 144 on free information card

Heffernan's mailer advertising his Custom Weed Control services came in the mail, Dunrite officials called him to take measures that would get their weed control problem "done right."

Like he does with all his customers, Tom first went out and surveyed the weed growth present on the lot. He then supplied a job proposal to the Dunrite firm indicating his suggested weed control program, projected results, and a cost quotation for year-round weed control.

On approval from the Dunrite officials of his proposal, Heffernan went to work. After preparing the ground, Tom selected Spike from Elanco Products Co., Indianapolis, Ind., which he applied with his ¾-ton pick-up truck spray rig.

Heffernan has his rig equipped with a 320-gallon fiberglass tank, drift-control nozzles with remote controls, a brush nozzle attachment giving him a 35-foot swath with hydraulically controlled booms mounted on the front of the rig. He has found the unit gives him needed flexibility to go from small patch area jobs to ditch banks and large farm acreages.

In servicing his customers, Heffernan makes follow-up calls (he even uses dummy billings to let customers know he was there servicing the account) and takes photos of the work both to remind his customer what the results have been and to use with other prospective customers.

His efforts have paid off. Beginning the second year of operation many of his customers have also requested the same service.

Other Heffernan accounts, amounting to over 3,200 acres controlled in just his first 10 months of business, include many other small to large businesses and industries, subcontracting pre-paving weed control jobs for road builders, to maintaining year-round vegetation control for utility substations, tank farms and irrigation control districts. His reputation is so good that he now even gets leads from large pest control firms whose accounts are interested in chemical weed control.

Although he's limited his working area to a four-county area around Fresno — "that's almost more than I can handle," — he is now seriously thinking about franchising his business operation to handle the great number of potential customers for total vegetation control in northern California.

Heffernan brought with him to his new business 27 years of experience as a crop chemical weed control specialist, a retailer of farm chemical spray equipment, and head of the West's largest railroad applicator firm.

Tom Heffernan believes the secret to his successful business is based on:

- Ownership operation
- Solid knowledge of the technical and practicabilities of weed control
- A total feel for business management and customer relations
- Picking the right location
- And most importantly, staying localized enough to make the right decisions on time. □

Best design for better penetration.

We make two heavy-duty aerators. The Ryan **Renovaire** has 12 tine wheels that operate in pairs. Unlike other models, they swing a full 18 inches to follow the contours of your land and ride over rocks instead of being damaged by them. Weight can be added to each pair for deeper penetration.

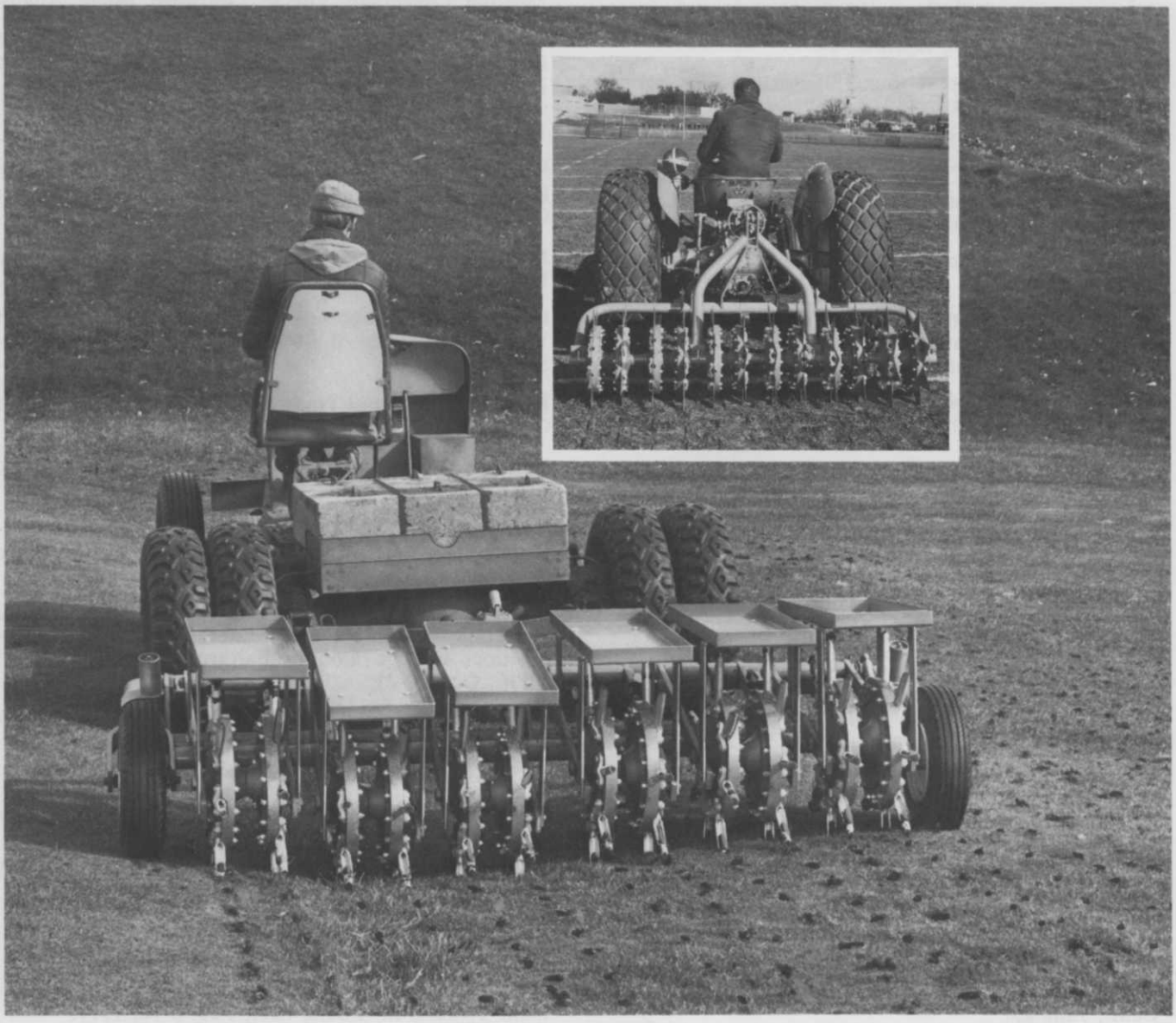
The Ryan **Tracaire** is an economical, rigid axle aerator. It's available with 9 or 12 tine wheels and has a 3-point hitch to force the tines into the turf.

Both models are fast and easy to use. Each can be used with interchangeable open spoon, closed coring, and slicing tines. And you can order a 12' by 10' dragmat as optional equipment.

The large area aerators from Ryan. We've designed them simply to work well. And built them to stay that way. For more information see your Ryan distributor or write: OMC-Lincoln, a Division of Outboard Marine Corporation, 6726 Cushman Drive, Lincoln, Nebraska 68501.

RYAN®
TURF-CARE EQUIPMENT

The large area aerators.



Meeting Dates

Oregon Golf Course Superintendents Association Meeting, Longview County Club, April 5.

Golf Course Superintendents Association of America seminar on "Principles of Landscape",Portland, Oregon, April 6-7.

Arizona Turfgrass Council Second Annual Turfgrass Materials and Equipment Show, Veteran's Memorial Coliseum, Phoenix, April 14.

National Park Service Training Institute/Grounds Maintenance Workship, Denver, April 12-16.

Rocky Mountain Golf Course Superintendents Association Meeting, Fox Hills Country Club, Longmont, Colo., April 15.

Metropolitan Golf Course Superintendents Association Meeting, Sunningdale Golf Club, April 15.

Wyoming Recreation and Park Association Annual Conference, Hitching Post Inn, Cheyenne, April 21-24.

Southern California Turf and Landscape Institute, Royal Inn, Anaheim, Calif., April 28-29.

Tennessee Golf Course Superintendents Association Meeting, Rockwood Country Club, May 3.

Oregon Golf Course Superintendents Association Meeting, Agate Beach Golf Club, May 3.

Pacific Seedmen's Association, 50th Annual Convention, Royal Lahaina, Maui, Hawaii, May 3-5.

Arizona Turfgrass Conference, Doubletree Inn, Tucson, Ariz., May 5-6.

Georgia Golf Course Superintendents Association Educational Program and Business Meeting, Atlanta Athletic Club, Duluth, May 11-12.

Rocky Mountain Golf Course Superintendents Association, Inverness Golf Course, Englewood, Colo., May 20.

Metropolitan Golf Course Superintendents Association Meeting, Greenwich County Club, May 20.

Florida Nurserymen and Growers Association Meeting, Thunderbird, Jacksonville, May 20-22.

International Society of Arboriculture, Western Chapter, Meeting, Hyatt Regency Hotel, San Jose, Calif., May 23-26.

California Association of Nurserymen, refresher course, California State Polytechnic College, San Luis Obispo, June 1-3.

International Marketing Conference sponsored by The Fertilizer Institute, The Greenbrier, White Sulphur Springs, W. Va., June 6-9.

Arizona Landscape Contractors Association Annual Meeting, Mountain Shadows, Scottsdale, Ariz., June 16-20.

Metropolitan Golf Course Superintendents Association Meeting, Pelham Country Club, June 17.

Golf Course Builders Association Meeting, Fresno, Calif., June 25.

Aquatic Plant Management Society, Annual Meeting, Pier 66, Fort Lauderdale, Fla., July 11-14.

American Socity of Landscape Architects Annual Meeting, San Diego, Calif., July 11-15.

American Sod Producers Association Summer Convention and Field Days, Treadway Inn, Newport Harbor, R.I., July 21-23.

The Fertilizer Institute Trade Fair, Cincinnati Exposition Center, July 26-28.

Tennessee Golf Course Superintendents Association Meeting, Crockett Springs National Golf Course, Brentwood, August 2.

International Society of Arboriculture Annual Meeting, Stouffer's Riverfront Towers, St. Louis, Mo., August 8-12.

Professional Grounds Maintenance Society Annual Meeting, Greenfield, Village, Dearborn, Mich., August 9-13.

Georgia Golf Course Superintendents Association Educational Program and Business Meeting, Northwood Golf and Country Club, Lawrenceville, August 9-10.

Symposium on Reclamation of Drastically Disturbed Lands, Ohio Agricultural Research and Development Center, Wooster, Ohio, August 9-12.

Plant Growth Regulator Working Group, Baton Rouge, La., August 11-14.

International Symposium on Biological Control of Weeds, University of Florida, Gainsville, August 30-Sept. 2.

Pacific Horticultural Trade Show, Anaheim Convention Center, California, Sept. 11-13.

Fourth Arkansas Turfgrass Field Day and Conference, Country Club of Little Rock, Sept. 14-15.

Northern California Turfgrass Council Turf and Landscape Irrigation Seminar, Asilomar Conference Grounds, Pacific Grove, Calif., Oct. 1-3.

Southern California Turfgrass Council 16th Annual Turfgrass Equipment and Materials Educational Exposition, Orange County Fairgrounds, Costa Mesa, Calif., Oct. 20-21.

Rocky Mountain Golf Course Superintendents Association Meeting, Willis Case Golf Course, Colorado, Oct. 21.

Central Plains Turfgrass Conference, K-State Union, Manhattan, Kansas, Oct. 21-22.

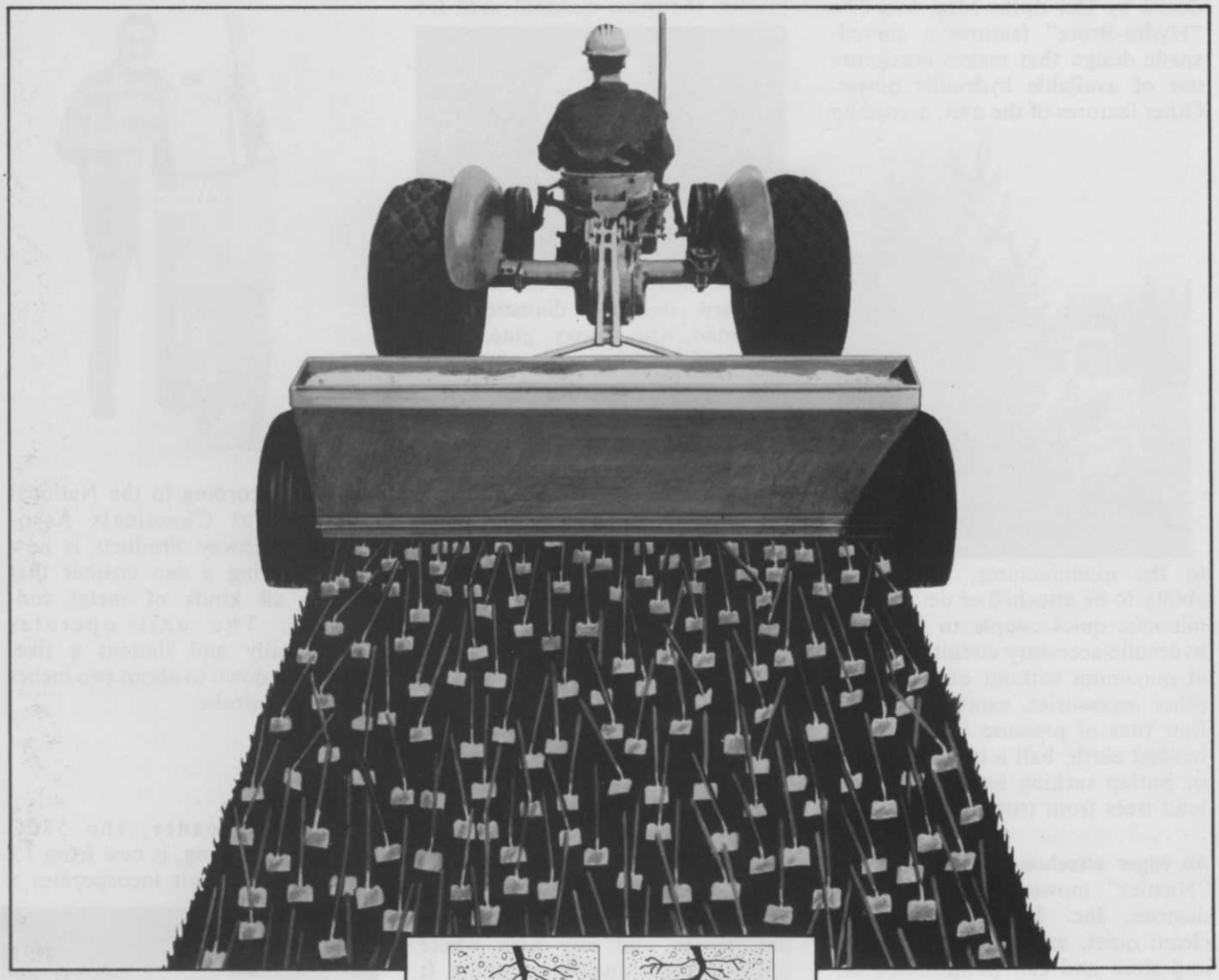
National Institute on Park and Grounds Management Conference, Marriott Hotel, Atlanta, Nov. 8-10.

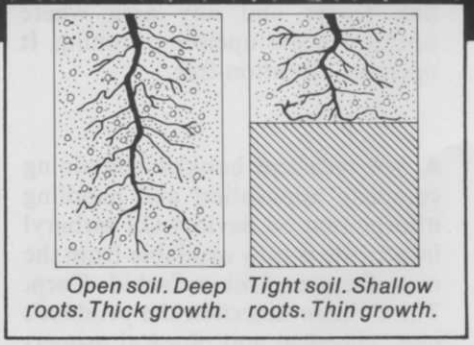
Washington Aviation Association Convention, Spokane, Nov. 18-20.

Weed Science Society Annual Meeting, Stouffer's Riverfront Towers, St. Louis, Mo., Feb. 8-10, 1977.

Soften soil this easy natural way.

Lawn & Garden Gypsum loosens heavy clay; stimulates vigorous growth.
Works like millions of tiny hoes.™





Open soil. Deep roots. Thick growth. *Tight soil. Shallow roots. Thin growth.*

Apply this neutral, non-burning soil conditioner to grassy areas, shrub and flower beds—wherever compacted soil can stunt normal root development. GRAND PRIZE® Lawn & Garden Gypsum breaks up tight soil, allows air and water to penetrate, helps fertilizers really get down to business.

And GRAND PRIZE also supplies essential sulfate sulfur and available calcium, promotes decomposition of organic materials, helps to neutralize damage from deicing salt and stray pets. Get all the facts on this ecologically-safe product that does so much for so little cost. Write to us at 101 S. Wacker Drive, Chicago, Illinois 60606, Dept. WTT-46

CHEMICALS DIVISION
UNITED STATES GYPSUM
Primary supplier of secondary plant nutrients

New Products

A tree replanter accessory for loaders and tractors has been introduced by Del Zotto Mfg. Inc. The "Hydra-Brute" features a curved-spade design that makes maximum use of available hydraulic power. Other features of the unit, according

to the manufacturer, include an ability to be attached or detached in minutes, quick-couple to available hydraulic-accessory circuits, operate at maximum without outriggers or other accessories, exert more than four tons of pressure to dig in the hardest earth, ball a tree for basket or burlap sacking and load or unload trees from truck-bed heights.

An edger attachment is new for the "Hustler" mower from Excel Industries, Inc. The edger is fast, clean, quiet, easy to use, maintain and store and can be mounted on the mower deck, according to the manufacturer. Because the edger does not hang over the trimming

side of the deck, it is safer than most power edgers, the company said. The broom/scraper attachment for the edger makes trimming tough grasses and weeds easy.

New tee markers on the market from Lesco Products are made of cycolac plastic, the same material used for

football helmets. The markers are standard five-inch diameter and cemented with epoxy glue. They float and come in red, white and blue colors.

TRIM-IT, a new weed-cutting, grass-trimming machine, utilizes a flexible filament of nylon and stainless steel. It offers total safety — and

gets up close to all jobs. It cuts and trims under benches, bushes, in vines and ground cover, around grave markers, sand traps, chain link fences and any area where operator needs upclose trimming. It operates vibration-free.

A new technical booklet containing complete application and handling information on Sevin 4-Oil carbaryl insecticide is now available from the manufacturer, Union Carbide Corp. The bulletin describes the product's uses, chemical and physical properties, toxicology and special characteristics of importance to users. Sevin 4-Oil is a new oil-based dispersion of Sevin carbaryl insecticide which provides longer residual insect control and affords certain application advantages, according to Union Carbide.

Metal chemical containers for insecticides or herbicides should be

crushed, according to the National Agricultural Chemicals Association. Richway Products is now manufacturing a can crusher that crushes all kinds of metal containers. The unit operates hydraulically and flattens a five-gallon can down to about two inches in a single stroke.

A backhoe/loader, the 580C Construction King, is new from J I Case Co. The unit incorporates a

number of features to improve productivity and serviceability, according to the manufacturers. Two of the most significant are a shock-absorbing unitized main frame and a componentized power train, which permit servicing of individual components without disturbing the rest of the drive line.

How to make your board see the value of new turf equipment.

Convincing your Board of Directors that new turf equipment is a neccessary and sound investment can be one of your most difficult tasks. They don't always see the benefits behind such a purchase.

And as good businessmen, they won't commit the money until they're sold on the expenditure. So when it comes time to face them, here are some of the things you should point out.

Point #1: The Duffer Demands More.

Today's golfer is more sophisticated than ever before. He has seen, and many times played, some of the finest courses in the world. He recognizes the value of a good course. And if yours is sub-par, he'll go elsewhere.

With this more sophisticated golfer comes the need for more sophisticated golf course maintenance. Heavy player traffic has increased the work required to keep the turf in top condition. So jobs that were once optional are now mandatory. Where spiking a green used to be sufficient, today it also needs deep aeration.

All this dictates the use of specialized equipment that wasn't available ten or even five years ago. Equipment that will enable you to build and maintain a top flight course, and help avoid special turf problems that could prove extremely costly.

Point #2: Machines Do More.

In the past decade, the price of labor has tripled. The same number of men must do more work in less time to give you the same value for each labor dollar invested. Mechanized equipment allows you to trim hundreds of unnecessary man-hours. One man can now cut more sod in an hour than six men used to cut in six hours. Or that same man can aerate 18 greens in a few hours instead of a few days.

New engineering concepts coupled with precision machinery means he'll do a consistently good job. You get better results and fewer occasions when a job must be redone.

And your turf equipment is depreciable; something your labor is not. You get an accounting break over a period of years. At the end, it's like owning a piece of free machinery. One that will continue to save you money long after you've paid for it.

Which brings us to the third point.

Point #3: Longevity Makes Them Worth More.

Equipment life should be a prime consideration when you select a manufacturer. The longer a machine works, the more it does, and the less maintenance it requires, the better your investment. And here's where we'd like to put in a little plug for Cushman and Ryan turf equipment.

Both lines of machinery are built to last . . . and last. It's not unusual to see a piece of Cushman or Ryan equipment still doing it's daily chores after ten or fifteen years of use. We believe the idea of "planned obsolescence" should be obsolete.

But performance is just as important as longevity. A Cushman Turf-Truckster and its accessories give you the capabilities to transport, spray, spike, dump, aerate, and top dress . . . all from *one* power source.

Ryan offers a machine for almost every turf task. Equipment that does a better job, in less time, and with a minimum of maintenance. For over 30 years, all Ryan equipment has been built with three goals in mind: quality, performance, and innovation.

If "A Day With the Board" is in your future, we'd like the opportunity to tell you more about the full line of Cushman and Ryan Turf equipment. Write to us and we'll send you our catalogs, full of detailed product information. Information that may help you open a few eyes to the value of new turf equipment.

CUSHMAN®

RYAN®

OMC-Lincoln,
a Division of Outboard
Marine Corporation,
6538 Cushman Drive,
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Got a problem with

SAND?

Sand in your water.

Now there's an easy, low-cost way to take sand out of your water. With a Laval Separator. There are no screens, no filters, no backflushing, no maintenance or cleaning. Just results.

There's a Laval Separator for every purpose. For farms. For sprinkler systems. For schools. For irrigation systems. For submersible and turbine pumps. For industry. For you. Whoever you are. Write us now and we'll send you complete information.

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W.I.N. with NITROFORM® and save!

W.I.N. with Nitroform® nitrogen . . . and save! In lower cost per pound of W.I.N.

Knox Fertilizer Bags It

HERCULES INCORPORATED

Turf and Horticultural Products
Wilmington, Delaware 19899
STH76-12

Circle 146 on free information card

A new model of the T-600 Trencher series, featuring a number of machine improvements, has been announced by Vermeer Mfg. Co. The new T-600C track-mounted

trenching machine now offers the Detroit 4-53 diesel engine as an additional option. Two major improvements are incorporated into the new machine — greater track clearance and enclosure of the final trencher drive in an oil-filled case.

Circle 708 on free information card

A broadcast seeder-spreader series has been introduced by Herd Seeder Co. Inc. The series has eight units,

the top of the line being the model 2440, which comes standard with hydraulic remote control as shown. An eight-page catalog is available.

Circle 709 on free information card

Stauffer Chemical Co. has made available new information bulletins designed to aid in pesticide selection. Each bulletin discusses, in chart form, one type of pest and its control. One bulletin deals with insecticides, a second with fungicides and the third with herbicides.

Circle 710 on free information card

Owners of the John Deere 8430 and 8460 4WD tractors can now mount and use the Waldon 10½-inch dozer

blade with the new mounting kit available from Waldon, Inc. The unit features solid mounting to the tractor frame, direct hydraulic cylinder hook-up, reversible and replaceable cutting edge and dual cylinder operation.

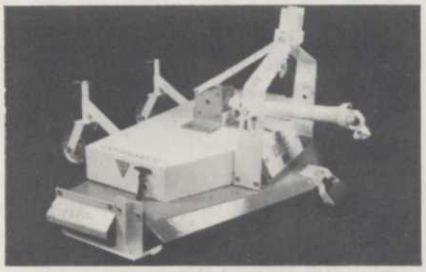
Circle 711 on free information card

A serrated 16-inch disc harrow is now available for Economy Trac-

tors, according to the manufacturer, Engineering Products Co. The harrow and other rear-mounted tools are attached in minutes by means of a standard three-point hitch. It is not necessary to remove front-mounted tools when using rear-mounted tools.

Circle 712 on free information card

Rear-mount grass mower featuring a gear-box drive has been introduced



by Sun-Mastr Corp. The unit was specifically designed for use with smaller tractors in the 16 to 30 PTO horsepower range. The unit also features drop-design blades.

Circle 713 on free information card

Servis machines are built with one simple idea in mind.

To be the best.

If you're familiar with the name, Servis, you know that we've been manufacturing rotary mowers, cutters and shredders, box scrapers, landscape rakes and rear-mounted blades for a long time. Since 1946 to be exact.

Interestingly enough, some of the first equipment we put in the field is still being used today. That's dependability.

And that kind of dependability is no accident. Servis equipment is designed to do specific jobs. And to do them better than anything else. It's also designed to last.

Take construction. Servis frameworks are unibody constructed to provide extra frame strength. And the high-stress areas are reinforced with heavy gauge tubing.

In addition, all of our rotary cutters feature safety devices to protect the tractor and cutter drive trains.

The gears and gear box shafts used on our machines are precision machined to increase strength and durability, and reduce noise.

And Servis is one of the few lines of equipment that offers you an option of blade carriers on rotary cutters. The Cyclone (dish-pan type) for cutting up to 3" brush. And the Gyro ("A" frame type) for cutting heavy 4" brush.

Of course, this is only part of our story. The point is that Servis builds a complete line of equipment with one simple idea in mind. To be the best.

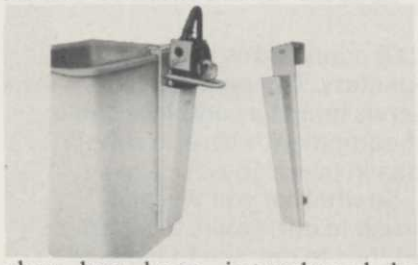
So whether you've got 4" brush to cut, stalks to shred, ditches to dig, soil to move or land to level, see your Servis dealer. He's got the equipment you need.

For more information about the Servis line, contact your nearest authorized Servis dealer, or write: Austin Products, Inc., Dept. 2-75 S, P.O. Box 1590, Dallas, Texas 75221.

SERVIS

We build equipment the way we do because you wouldn't settle for less.

A chain saw scabbard that will accomodate gasoline and hydraulic power saws with blades up to 36 in-



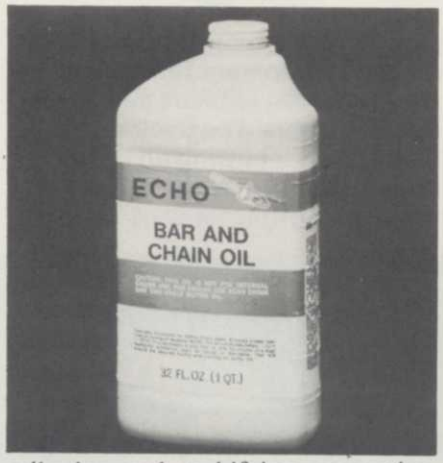
ches has been introduced by Hastings Fiber Glass Products. Made of the non-conductive reinforced fiber glass, the scabbard mounts readily on trucks and buckets for quick and easy access to the saw. The scabbard has an overall length of 36 inches with the top opening measuring 3 inches by 5¾ inches.

Circle 714 on free information card

A new elm that is as beautiful as the American elm but immune to Dutch elm disease is being offered to nurserymen, land developers and landscapers by Sheerlund Forests. The Sheerlund elm — botanically known as *Zelkova serrata* — is a majestic, useful tree for homes, parks, golf clubs, cemeteries and other locations. It offers a wine glass shape and grows up to three feet a year.

Circle 715 on free information card

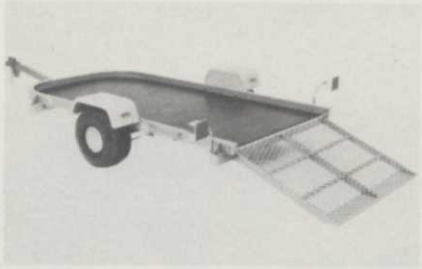
Bar and chain oil contains a special additive designed for most lubricate applications has been introduced by the Echo Chain Saw Division of Kioritz Corp. of America. The ad-



adhesive and tackifying properties which have been previously primarily utilized in greases, spindle oils and gear oils.

Circle 716 on free information card

The Snow Co. has published a price list for its utility trailer with loading ramp. The listing includes prices for the trailer, bracket, spare tire



mounting, tongue stand with retractable wheel, tongue jack with caster wheel, cap, hub and tire and wheel.

Circle 717 on free information card

A pick-up truck can do double duty when it is equipped with Crysteel Mfg. Inc.'s new "LO-BOY" pick-up

truck hoist. Patterned after its heavy-duty predecessor, the unit nests within the frame without raising the bed or decreasing road clearance. With a three-ton capacity rating, the manufacturer claims it can lift as much as the truck is built to haul.

Circle 718 on free information card

A rotary tiller, the Krone RL100 lightweight 49-inch unit, has been introduced by KMN Farm Equipment Inc. The company recom-

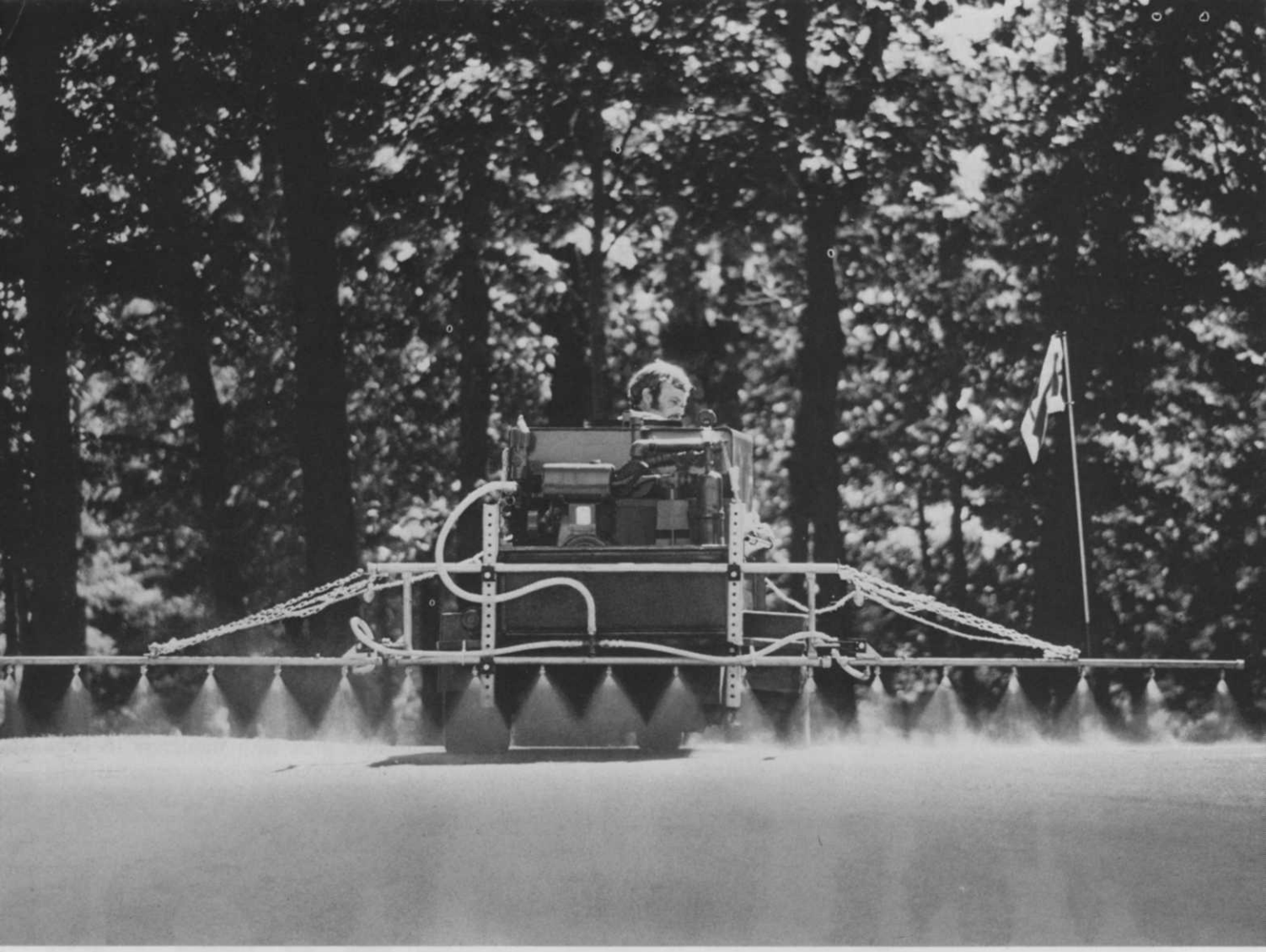
mends its use for landscaping engineers, parks and orchards because of its small size and low horsepower requirement — 12 to 40 horsepower.

Circle 719 on free information card

Modular electronic irrigation sprinkler controller from Weathermatic Division of Telsco Industries offers 10, 20 or 30 station flexibility. Features include variable timing; alternate day, repeat cycle and calendar programming; dry indexing mode; non-removable trip pins; automatic, semi-automatic or manual operations.

Circle 720 on free information card

Circle 140 on free information card



You can't beat a boom for precision.

When you're spraying 3 gal/1000 sq ft of a touchy chemical mix, you need all the control of volume, direction and coverage you can get. And you can see the precision you get with our 1010 utility vehicle sprayer above. It treats a green with care. 19 nozzles on 10" spacings give 15 ft of even coverage and controlled pressure drives the chemical into the problem zone. With stainless steel tank and mechanical agitation. Plus optional hose and gun for spot spraying and tree work. For tees, greens, fairways and around the clubhouse, for fungus, weeds and insects, we have a full range of boom sprayers. And labor-saving air sprayers for turf and tree care. But most important, we have the machines that provide the spray power to meet every professional turf need. Call your local FMC Dealer or call Jack Custer at (501) 935-1970, FMC Corporation, Agricultural Machinery Division, 5601 E. Highland Drive, Jonesboro, Ark. 72401.

FMC Environmental Equipment

A sod harvester manufactured by Princeton Mfg. Co. is the subject of a new bulletin published by that company. The company's "Tow-Boy" is designed to harvest 16-inch wide sod where vegetative regrowth is required or where weight due to thickness of cut or sand conditions requires small pieces of handling, for the Model 4816. Model 4020 cuts 20-inch wide slabs 40 inches long.

Circle 721 on free information card

Lor-Al Corp. offers the concept of self-nursing in fertilizer application with development of the model 3200 SN Easy-Rider. The heavy-duty diesel applicator mounts a two-compartment, 16-ton dry body or a two-compartment, 3,000-gallon liquid body on a tandem chassis. Features of the self-nursing concept are high load capacity with compartmented bodies and high speeds over the road and in the field.

Circle 722 on free information card

Modular shelves for mobile storeroom vans have been introduced by Knaack Mfg. Co. The shelves are constructed from 18 ga. steel, welded throughout with one-piece

steel back riveted in place for maximum rigidity and convenience. Bin dividers are optional and all shelves install singly or stack.

Circle 723 on free information card

This is the machine that revolutionized the turf industry . . . the machine that seeds or sprigs, fertilizes, waters, sprays, and mulches in one easy operation . . . the BOWIE HYDRO-MULCHER.

Its performance and reliability are unequaled. Its capabilities have created a whole new industry of lawn and turf, ground cover and erosion specialists. The BOWIE HYDRO-MULCHER is the daddy of them all . . . the green machine!

EXCLUSIVE BOWIE HYDRO-MULCHER FEATURES:

- Only proven unit for both sprigging and seeding with cellulose fiber mulches.
- Can mulch, fertilize and seed or sprig half an acre in eight minutes.
- Has enclosed shredder bar for shredding full bales of cellulose fibers.
- Has centralized tower control with no hoses.
- Has triple agitators for faster mixing and eliminating sediment build-up.
- Uses pump only for spraying, so pump lasts longer.
- Has spray mist and other accessory nozzles for such uses as insect control, tree spraying and fire fighting.
- Six models — from 350 to 3,000 gallon capacity.

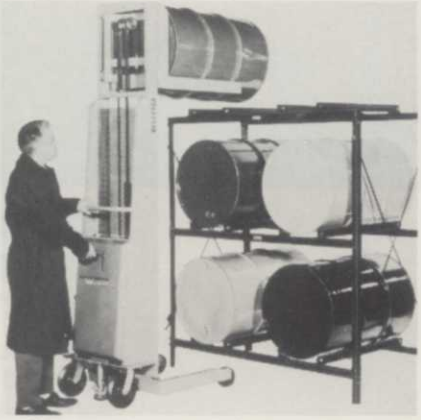
CALL OR WRITE FOR COMPLETE DETAILS:

HYDRO BOWIE MULCHER

BOWIE INDUSTRIES, INC.
P.O. BOX 931, BOWIE, TEXAS 76230
(817) 872-2286

Circle 155 on free information card

Drum lifters from Weil Service Products Corp. handle drums in any work area with moderate to large drum-handling requirements. The



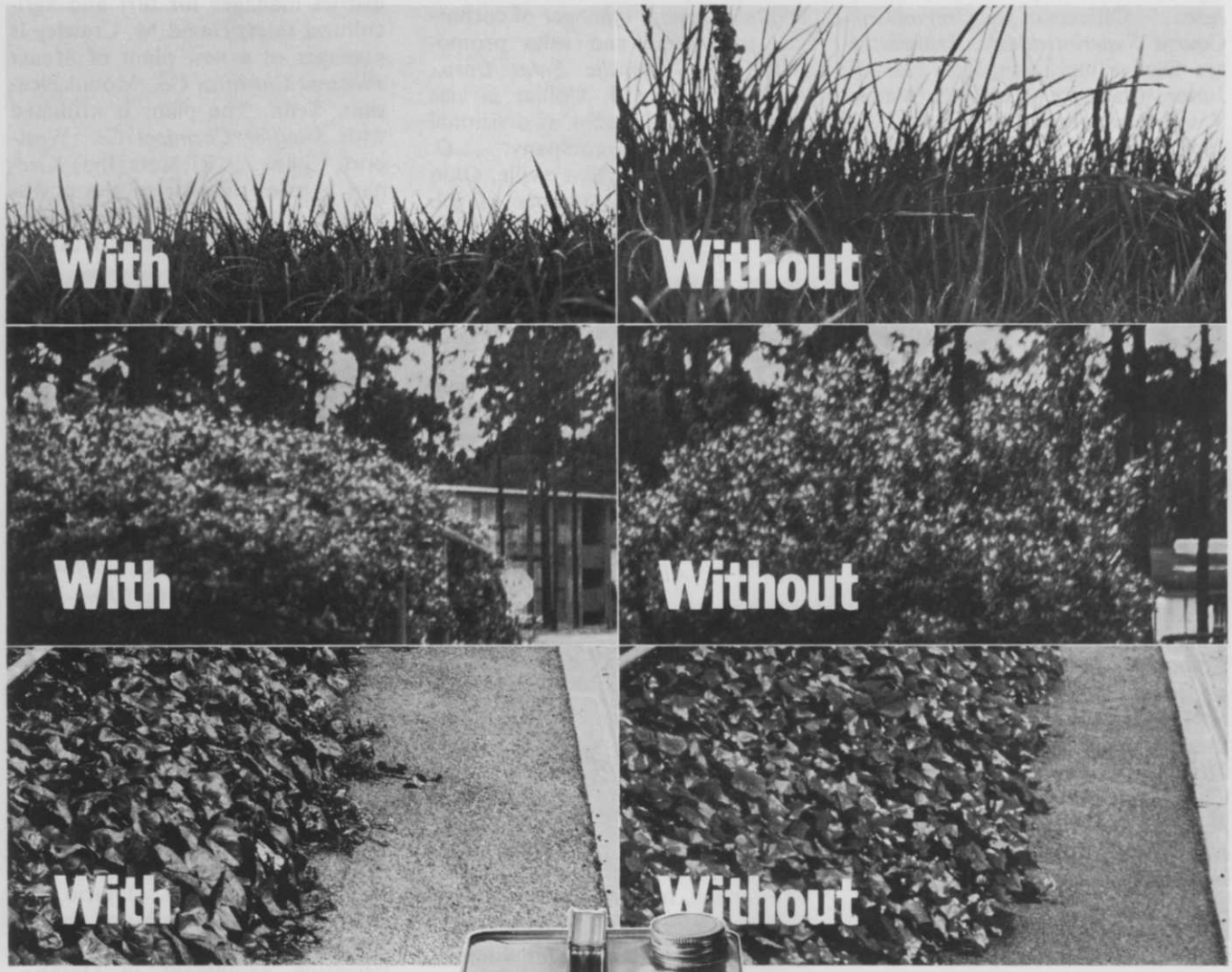
units can be used for many other materials-handling jobs by simply slipping a low-cost accessory plate over the lift arms.

Circle 724 on free information card

An eight-horsepower front engine riding mower is being manufactured by Allis-Chalmers Corp., Lawn and Garden Equipment Div. The 608 LT has three speeds forward and one reverse with an all-gear, belt-driven transmission. A Briggs and Stratton engine with 12-volt electric starter will be standard. Mower attachments hook to the front axle enabling the deck to follow the contour of the ground and provide non-scalp mowing, the company said.

Circle 725 on free information card

Don't kill it. Control it.



MAINTAIN® CF 125 is the growth retardant that thinks like a gardener. It works with nature, not against it.

MAINTAIN effectively slows the growth rate of grass, shrubs and trees. That means less mowing, trimming, edging and pruning. And that means you'll be cutting down on maintenance costs.

Just about everything MAINTAIN touches grows slower. (How much slower depends on the kind of weather and greenery you've got.)

Your maintenance people won't have to go out on a limb, either. MAINTAIN can be sprayed where machinery can't go. Up steep slopes, around guard rails, along fences.

Besides keeping a green thing from getting out of hand, MAINTAIN practically puts a stop to pesky broadleaf weeds.

U.S. BORAX
A MEMBER OF THE RTZ GROUP

In your business, nature running wild can increase the chance of fire or damage. So you can spend a lot of money on maintenance, use a soil sterilant to eliminate vegetation, or use a growth retardant to control nature and keep things green.

Naturally, it makes more sense to use MAINTAIN.

Contact your U.S. Borax distributor or your nearest U.S. Borax office.

California: 3075 Wilshire Blvd., Los Angeles 90010
Georgia: 296 Interstate N. Parkway, Atlanta 30339
Illinois: 1700 E. Sherwin Ave., Des Plaines 60018
New Jersey: 60 Craig Road, Montvale 07645
Canada: 234 Eglinton Ave., E., Toronto, Ont. M4P 1k5

People on the Move

Ken Smith is superintendent at *Rolling Hills Country Club, Wichita, Kan.* . . . Officers of the *Oregon Golf Course Superintendents Association* are Dick Fluter, president; Harvey Junor, first vice president; Wayne Van Matre, second vice president; Jon Hooper, John Rogers, John Slaughter, Jack Smith and Ray Tel-

B. Smith

Wiemken

fer, directors. . . . Officers of the Golf Course Superintendents Association of New England are Wayne Zoppo, *Agawam Hunt*, East Providence, R.I., president; Dean Robertson, *Chestnut Hill Country Club*, Newbury, Mass., first vice president; Ronald Kirkman, *Needham Golf Club*, Mass., second vice president; Dave Barber, secretary; Donald Hearn, *Weston Golf Club*, Chelmsford, Mass., treasurer; Paul Johnson, *Ferncroft Country Club*, Middleton, Mass., Arthur Washburn, *Cohasset Golf Club*, Mass., and Max Mierzwa, *Chicopee Country Club*, Mass., trustees. . . . Officers of the Metropolitan Golf Course Superintendents Association are Garry Crothers, *Apawamis Club*, president; Robert DePencier, *Westchester Country Club*, first vice president; Charles Martineau, *Whippoorwill Country Club*, second vice president; Robert Alonzi, *Burning Tree Country Club*, treasurer; Richard Gonyea, *Rye Golf Club*, secretary; Allan Tretera, Ray Twombly, James Kaczenski, Terry Mulligan, Mike Maffei and Ralph Castelli, directors. . . . *Velsicol Chemical Corp.*, Chicago, has announced three job moves: Eugene E. Taylor is vice president, Agricultural Business Group; Thomas C. Zinninger is executive vice president; and Robert A. Baker is vice president, Chemicals and Resins Business Group. . . . Jeremiah J. Attridge is general manager of corporate advertising and sales promotion, *Johns-Manville Sales Corp.*, Denver. Robert J. Collier is vice president and director of divisional advertising for the company. . . . *O. M. Scott & Sons*, Marysville, Ohio has announced a number of job changes: Robert D. Farley is technical representative for eastern Tennessee and northern Alabama; Pat Ardoin is in Louisiana and southern Mississippi; Howard Gaskill will serve eastern Los Angeles; Keith Webster will handle northern and central Florida plus southern Georgia; Jon Treibly will handle most Oklahoma, northern Texas, Northwestern Louisiana and southwest corner of Arkansas; Wayne Wiemken will handle west central Florida. . . . *Allis-Chalmers Corp.*,

Layel

Gaskill

Milwaukee, has announced two job changes: Warner C. Frazier is vice president of marketing for Simplicity Mfg. Co.; Thomas H. Hock has been named vice president of engineering for Simplicity, a division of Allis-Chalmers. . . . Michael Beck is eastern divisional sales manager for *Reach-All Mfg. and Engineering Co.*, Duluth, Minn. Other changes include: Gerald R. DeMeo is executive vice president of Reach-All Sales and Service, a separate corporation; Roger Zuck is sales vice president of special factory direct accounts for Reach-All; Wendell Wilson is vice president of engineering and marketing and Michael Mirau is vice president of finance and sales order processing. . . . William E. Davis is general sales manager of *Lockwood Corp.*, Gering, Neb. The company manufactures center-pivot irrigation systems. . . . *Rain Bird Sprinkler Mfg. Corp.*, Glendora, Calif. has announced three changes: Bruce Smith is western regional turf sales manager; Dick Kneip is upper midwest district manager for turf and agricultural sales; David M. Crawley is manager of a new plant of *Mount Pleasant Chemical Co.*, Mount Pleasant, Tenn. The plant is affiliated with *Stauffer Chemical Co.*, Westport, Conn. . . . Richard (Jim) Kiernan is sales director of the northeastern region for *Excel Industries, Inc.*, manufacturers of the "Hustler"

Ardoin

Farley

mower. . . . Bobby G. Joyner is plant pathologist with *Chem-Lawn Corp.*, Columbus, Ohio. . . . Harvey A. Crippen is general manager of the Los Angeles operation of the Pipe Products Division of the *Flintkote Co.*, Akron, Ohio. . . . Thomas C. Reeves is market planning manager in the worldwide agricultural chemicals marketing planning department of *Elanco Products Co.*, Indianapolis. . . . *Turf Care Products, Ltd.*, Markham, Ontario, has been appointed distributor for all *Toro* lawn and turf maintenance and irrigation equipment in Ontario. James L. (Mike) Donahue will head the distributorship. . . . Walter Androsko is with the expanded Turf and Arboriculture Technical Service and Sales Department of *B. G. Pratt Division*, Gabriel Chemicals, Ltd., Peterson, N.J., manufacturers of pesticides for trees, turf and ornamentals. . . . Thomas L. Dehner is branch manager of the Omaha Distribution center of *Thompson-Hayward Chemical Co.*, Kansas City, Kan. . . . The Agricultural Division of *Ciba-Geigy Corp.*, Greensboro, N.C., has announced a number of changes: John King is district sales manager in Florida; Ron Lichti is district sales manager in Michigan;

Good things come in small packages.

Whether you purchase seedlings for permanent planting or prefer to grow your own stock for later transplanting, you'll be impressed with our wide variety of fir, pine and spruce seedlings. Northern-grown for hardiness, they've all been personally cared for by the owner to assure that you receive only the very best.

As a businessman, you'll appreciate our dependability almost as much as our reasonable prices.

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Bill Anliker is field research senior scientist; Jerry Smith is senior analytical chemist; Bob Conner is senior technical sales service specialist; Ivan Szolics is assistant metabolism chemist; Darrell Sumner is project scientist; Bruce Simoneaux is project scientist; Michael Barringer is associate analytical chemist; Lary Treanor is marketing planning specialist; Angus Morrison is senior technical information services specialist; Leonard Parker is

Collier

Taylor

senior technical information services specialist; Alex Polinsky is associate analytical chemist; Hilary Erskine is librarian; Bob Peters is production formulation services manager; Gordon Kane is pilot plant operations group leader. . . . Officers of the *Virginia Nurserymen's Association* are: Charles F. Young, Glenwood Garden Center, Richmond, president; John E. Tankard Jr., Tankard Nurseries, Exmore, vice president; Fletcher Flemer, Ingleside Plantation Nurseries, Inc., Oak Grove, secretary-treasurer. . . . Officers of *West Virginia Nurserymen's Association* are; Marcus Rennix, Rennix & Sons, Valley Bend, president; Woodroe Henderson, Henderson's Nurseries, Charleston, vice president; O. M. Neal, Morgantown, secretary; and Norman Cole Jr., Cole Nurseries, Inc., Forest Hill, Treasurer. . . . Jess D. Caudillo is director of parks and recreation for Dover, Mass. . . . Officers of the *New Jersey Association of Nurserymen* are: William J. McNaughton Jr., McNaughton's Nursery and Landscape Co., Inc., Cherry Hill, president; Joseph Cerbo, Cerbo Parsippany Greenhouses & Garden Center, Parsippany, first vice president; Joseph Locke, Village Nurseries, Hightstown, second vice president; David Buchholz, Glen Summit Nurseries, Inc., Pittstown, treasurer; and Herman Panacek, Herman Panacek Jr., Inc., Ringoes, assistant treasurer. . . . Officers of the *Kentucky Nurserymen's Association* are: John Korfhage, Korfhage Florist & Nursery, Louisville, president; James Merchant, Many Oaks Nursery, Baghdad, vice president; Robert Maddox, Ammon Garden Center & Landscaping, Inc., Florence, treasurer. . . .

Baker

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Officers of the *Georgia Nurserymen's Association* are: Dick Hackney, Wight's Nursery, Inc., Cairo, president; Don McCorkle Nursery, Inc., Augusta, vice president; Len Powell, Powell Nursery, Thomasville, secretary; and Ted Davis, Hickory Hill Nursery, Smyrna, treasurer. . . . Officers of the *South Carolina Nurserymen's Association* are: Doug Taylor, Greer Nursery & Garden Center, Greenville, president; Dwight Derrick, Rocky Creek Nursery, Irmo, vice president.. . . Officers of the Rocky Mountain Chapter of the *International Society of Arborists* are: Carl Jorgensen, Dept. of Horticulture, Colorado State University, Fort Collins, president; Gil Wilhelm, C. K. Angle, Inc., Englewood, president-elect; Bill Stucky, state forester, Colorado Springs, vice president; Ken Hostetler, Colorado State Forest Service, Denver, secretary; Jerry Morris, Rocky Mountain Tree Experts, Lakewood, treasurer; and Bert T. Swanson, Dept. of Horticulture, Colorado State University, editor. . . . Avin Guidry, Guidry's Nursery, Martinvillee, La., is new president of the *Louisiana Association of Nurserymen*. . . . E. B. Eyerly, *Lew Hammer, Inc.*, Denver, is president of the *Colorado Horticultural Research, Inc.* . . . Emil deWilde, owner of deWilde's Nurseries, Bellingham, Washington, is president of the *Washington State Nurserymen's Association*. . . . Bruce Eisdengart is manager of *San Luis Nursery*, San Luis Obispo, Calif. . . . Don Willis has joined the *Plant Shack Nursery*, Bonita, Calif. . . . Gilbert C. Crowell Jr. is agricultural chemicals regional sales manager for the western region based in Fresno, Calif. for *Elanco Products Co.*, Indianapolis. . . . George H. Giblin is park superintendent at the new Oakwoods Metropark in Detroit. He retains his post of park superintendent at Lower Huron Metropark and is also in charge of Willow Metropark. . . . New officers of the *Golf Course Superintendents Association of Arkansas* are Billy Smith, Searcy Country Club, president; Leon Morris, Searcy Country Club, vice president; Mark Spain, Little Rock Country, secretary-treasurer; Guy Honeysuckle, Hindman Park, Little Rock, Marcell Tynes, Rosswood Country

Joyner

Reeves

Circle 143 on free information card

Club, Pine Bluff and Spain, Directors. . . . Diane Davies is director of Parks and Recreation Department for Monroe, Ga. . . . Dr. Charles L. Wilson of the Ohio Agricultural Research Development Center, Wooster, is president of the Ohio Chapter of the *International Society of Arboriculture*; C. M. Girtch is deputy superintendent for operations for the *Seattle Department of Parks and Recreation*. . . . Daniel Hope III is director of parks for Charleston, S.C. . . . Dick Bone is sales manager of parts accessories and service for *F. E. Myers Co.*, Ashland, Ohio. Other moves by that company are: Paul L. Blackwell is vice president of marketing and sales, and Bob Casciani is vice president of engineering and manufacturing. . . . Lawrence A. Zehnder is director of parks and recreation for Athens, Tenn. . . . Ronald R. School is eastern region manager for *J I Case Co.*'s Construction Equipment Division. He had had various positions with Case's Agricultural Equipment Division. . . . Joseph Caverly is commissioner of parks, recreation and conservation for Westchester County, New York. . . . Dick Fish is district manager for Georgia, Florida, North Carolina, South Carolina, Virginia, Maryland and Pennsylvania for *Drexel Chemical Co.*, Memphis, Tenn. . . . *ProTurf Division of O. M. Scott & Sons*, Marysville, Ohio has promoted eight technical representatives to the positions of senior technical represen-

Donahue

Kiernan

tatives. They are: Jim Chapman, western Oregon and western Washington state; Keith Webster, northern Florida; Dave Green, western Ohio and parts of Indiana and Kentucky; Dick Warner, central Ohio; Tom Leonard, southern Texas, Ted Mulcahey, southeastern Michigan; Bill Stinson, Dutchess and Putnam Counties in New York; and Mike Kolb, a portion of Florida and the tourist islands off the Atlantic Coast. . . . Michael J. Janis is director of the parks and recreation department for Harvey County, Kansas. . . . Raymond E. Gregg, Jr., general manager of *John Deere* Horicon Works, Wisconsin, has been named new president of the *Outdoor Power Equipment Institute*. . . . Dave Bruels is vice president in charge of sales and Loren Prothe is vice president in charge of manufacturing at *Ross Daniels, Inc.*, West Des Moines, Iowa. . . . New officers of the *Wisconsin Landscape Contractors Association* are: Joseph L. Nevels, Joe Nevels Landscape Co., president; Matt Stano, Stano Landscaping, Inc., vice president; Richard Brierer, Hillcrest Landscaping Co., treasurer; and Marshall Schiebe, Schiebe and Schiebe Landscaping, secretary. . . . *California Landscape Contractors* has elected new officers: Walter J. Burrows, president; Bill Kessloff, president-elect; Joe Tanouye, vice president; Jim Keener, vice president; Gerald Bliss, secretary-treasurer; Gregg Myer, associate member representative. . . . Doug Moore is sales manager for the San Diego branch of *Pipeway Irrigation, Inc.* . . . Thomas L. Balisle and James R. Johnson are product manager and merchandising manager, respectively, for the agricultural sales and marketing division of the *Allis-Chalmers Corp.*, Milwaukee. . . . Bern Stonehouse is an associate of the firm *Associated Irrigation Consultants*, Los Angeles. . . . New officers of the *Ohio Nurserymen's Association* include: Dale Manbeck, Manbeck Nurseries, Inc., New Knoxville, president; Robert Setzer, Horton Nursery Sales, Cleveland, president-elect; Richard Warren, Cole Nursery Co., Inc., Circleville, past president; and I. P. Olmsted, executive secretary. Members of the executive committee are: C. Van Bourgondien Jr., Berryhill Nursery Co., Springfield; Gail Ruckel, Warner Nursery Co., Willoughby; William Studebaker, Studebaker Nurseries, Inc., New Carlisle; Gary Thornton, Thornton Environmental Industries, Cincinnati; Larry Kobel, Kobel's Nursery, West Lafayette; and Brian Gilson, Gilson's Garden's, Perry. . . . Officers of the *Massachusetts Nurserymen's Association* are: R. Wayne Mezitt, Weston Nurseries, Inc., Hopkinton, president; Donald J. Ward, Ward's Nursery, Inc., Great Barrington, vice president; Richard Briden, Arrowhead Gardens, Inc., Wayland, secretary-treasurer. Di-

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rectors are: Reuben E. Lebeaux, Shrewsbury Nurseries; Neil Van Sloun, Sylvan Nursery, South Westport; James K. Stewart, Stewart's Nursery, Inc. Turners Falls; Richard W. Bemis, Bemis Farms Nurseries, Spencer; Arthur Gaklis, Gold Star Wholesale Nursery, Lexington; and Palmer W. Bigelow Jr., Bigelow Nurseries, Inc., Northboro. . . . New Officers of the *Connecticut Landscape Contractors Association* are: James Cunningham Jr., president; William Butler, vice president; Albert Glazier III, secretary; and Dana Hinman, treasurer.

Circle 145 on free information card

Golf course superintendents from around the country were introduced to snowmobiling while attending the annual GCSAA turf show in Minneapolis. Over 50 superintendents and their wives were treated to an afternoon of snowmobiling, courtesy of Polaris E-Z-Go, division of Textron. The company makes snowmobiles in addition to golf cars.

Activated Charcoal Use for Turf Studied

Two University of Delaware researchers have found that activated charcoal can be used to correct weed control chemical mistakes in application and other problems.

Dr. William Mitchell, professor of plant science, and Barry Hesseltine, researcher assistant, have found that activated charcoal or the "black eraser" can often "tie up" spray residues and let a turf manager safely proceed with a new seeding or sodding. Some of the most popular herbicides used for preemergence crabgrass control will also prevent the establishment of new turf for a period of two to three months after application.

Mitchell and Hesseltine say that if, after treatment with a crabgrass killer in April, it is decided that the turf needs reseeding, mistakes can be erased by spraying about seven pounds of activated charcoal on each 1000 square feet. A new seeding can be made the same day without damage from the crabgrass killer residue.

The researchers also found that herbicide residues can slow up the growth rate of newly installed sod and in some cases actually prevent the sod from bonding with the underlying soil.

Activated charcoal was effective in eliminating this potential cause of sodding failure. The research conducted ty Mitchell and Hesseltine was reported at the recent Northeastern Weed Science Society meetings in Boston. Tests involved several herbicides and lawn grasses. The tests showed tall fescue to be more tolerant of some herbicide residues than either perennial ryegrass or Kentucky bluegrass.

Mitchell stressed that since a large percentage of the cultivated sod used for home lawns contains cultivars of Kentucky bluegrass, it is important that the presence of herbicide residues be considered. He said it has been shown that where a residue problem exists, it can be minimized or eliminated by use of activated charcoal.

Arizona Turf Conference Headed by Lofts' Ledeboer

Dr. Fred B. Ledeboer, director of research, Lofts Pedigreed Seed Co., Bound Brook, N.J., will headline the Arizona Turfgrass Conference scheduled for May 5 and 6 at the Doubletree Inn, Tucson, Dr. William R. Kneebone, University of Arizona turf scientist and program chairman, has announced. Ledeboer will discuss cool season grasses.

Other speakers include Clyde Elmore, extension weed scientist, University of California, Davis, who will discuss weed control for ornamentals; and Jack D. Butler, extension turf specialist, Colorado State University, Fort Collins, Colo., who will serve as conference keynoter.

Also, Thomas J. Meeks, regional director for the U.S. Golf Association, Far Hills, N.J., will describe "Getting a Golf Course Ready for a Tournament." Kneebone says the banquet speaker is Andy A. Bertoni, of the W. A. Cleary Corp., who lives in Northville, Mich.

Landscape Association Names Five Design Award Winners

Residential design awards were presented to landscape architects and installing firms for outstanding work by the National Landscape Association at the recent Landscape/Garden Center Management Clinic in Louisville, Ky.

Awards in the complete residence category were given to Green Bros. Landscape Co., Inc., Smyrna, Ga.; and to Chazz Cox Associates and Gateway Gardens, Inc. in Winter Park, Fla. In the multifamily residence category the top award was presented to Wayne Mucci Associates, Lake Forest, Ill.; other awards were given to Foley-Koch Landscaping, Inc., Mt. Prospect, Ill. and Moore's Landscape and Nursery, Glenview, Ill. In the active use area category an award was presented to Concepts, Inc., Ridge, N.Y. In the entrance category, Chazz Cox Associates and Gateway Gardens, Inc. took honors.

Dr. Watson Receives Award From USGA Green Section

The Green Section of the United States Golf Association has given its top award for distinguished service to Dr. James R. Watson, vice president of customer relations and chief agronomist for Toro Co., Minneapolis.

Dr. Watson, honored for his contributions to turf research, is the 16th recipient of the award which is made annually. He has conducted research on adaptability of species and strains of turfgrasses, fertilization practices, snow mold prevention and techniques for the winter protection of turfgrasses. His turfgrass adaptation studies led to the development of new cultivars in Bermudagrass and creeping bentgrass for sports turf.

He is a contributor to several standard texts on turfgrass science and has also written many articles on turfgrass care and management.

Housing Developments Hold Course Market Key

While the golf course market will always constitute an important business for Toro Company, Minneapolis, its prospects for reestablishing its high past growth rate will depend in part on an easing of interest rates and the trend toward golf courses in new housing developments.

In the company's annual report recently released, it was noted that increased marketing emphasis is being given by the company to other high-growth areas; the commercial markets for the Turf Products Division and the commercial and agricultural markets for the Irrigation Group.

The report said the golf course market accounted for 13 percent of Toro's sales in 1975, for irrigation products and turf maintenance equipment. With a decline in the construction of new courses from about 450 to 150 last year, Toro feels the existing golf course market represents the principal short-term opportunity for Toro's irrigation and mowing equipment.

All-Pro Tingelhoff Applauds Natural Turf

The conversion back to natural turf at Miami's Orange Bowl represents a "substantial victory" for the National Football League Players Association, according to all-pro center Mick Tingelhoff of the Minnesota Vikings.

He said the association opposes artificial turf because its hard-asphalt base and slippery surface produce more knee injuries than natural grass fields. He predicted NFL owners will never again replace natural grass with artificial turf.

"I hope the switch back to natural grass in Miami heralds a new trend," the Viking star said at a luncheon sponsored by Cushman-Ryan turf care equipment during the 47th Golf Course Superintendents Association of America conference in Minneapolis. The 35-year-old Viking player, whose team plays its home games on natural turf, said artificial playing surfaces also can shorten a player's career. He said the hard surfaces subject legs to a "merciless pounding" and result in bruises and similar nuisance injuries.

"Asphalt really wears you out and it can wreck your legs," Tingelhoff told more than 120 turf equipment dealers. "There is no way you can recover from your injuries within a week. I don't know of a player, trainer or team physician that likes artificial turf."

The former University of Nebraska All-American said artificial turf surfaces "are faster" than natural grass. But he said even small running backs, who rely on speed, dislike artificial turf fields. "What good is speed if you ruin your knees falling on a hard surface?" he asked. "The greater the speed, the more force there is upon impact. It is a matter of basic physics and every running back knows it."

However, Tingelhoff admitted, it is impossible to prove artificial turf has ended or shortened anyone's NFL career. "The association would definitely put artificial turf to an end if we could," he said. "But I don't know how we could prove it." He said Robert Kennedy Memorial Stadium in Washington, D.C has the best playing surface in professional football. The field has Nugget bluegrass on a 20-inch base largely formed of sand and peat. Irrigation drainage and heating are controlled by small underground lines plus a water pump inside the stadium.

"The surface is very porous and soft," he said. "It is actually softer than natural turf surfaces, so therefore, fewer knee injuries result. And the field actually drains faster than artificial surfaces."

Nelson Is New President Of Landscape Contractors

Duane Nelson, a landscape contractor in Spokane, Wash., has been installed as president of the Associated Landscape Contractors of America at its recent annual meeting in Phoenix, Ariz.

Also installed were Dick Brickman, Theodore Brickman Co., Long Grove, Ill., president-elect; Ronald A. Ahlman, Lawrence & Ahlman, Dundee, Ill., vice president; William C. Byers III, Landscape Industries, Inc., Smyrna, Ga., vice president; William Thornton Jr., Thornton Industrial Landscape Contractors, Cincinnati, Ohio, treasurer; and Vernon D. Smith, Millcreek Gardens, Inc., Salt Lake City, Utah, secretary.

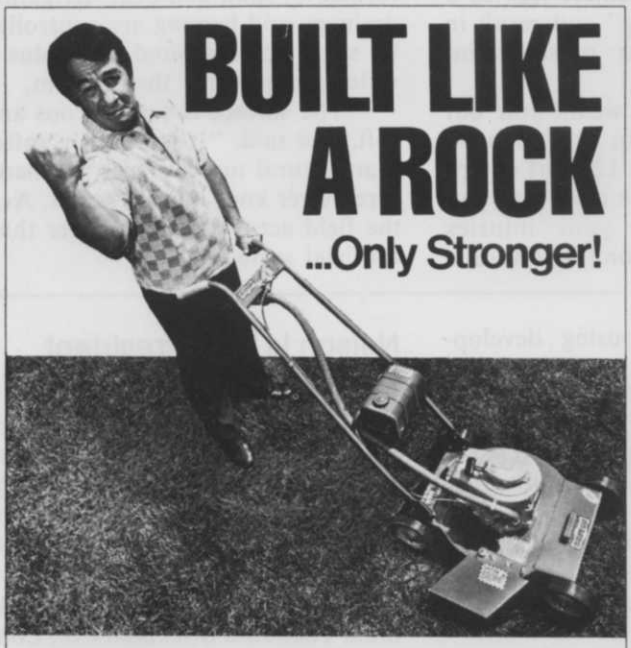
Nine Outstanding Dealers Honored by Cushman-Ryan

Nine firms have been named outstanding dealers by Cushman-Ryan turf care equipment, Lincoln, Neb.

Officials from the dealerships were presented plaques by Frank McDonald, Cushman-Ryan sales manager, at a luncheon during the 47th annual Golf Course Superintendents Association of America in Minneapolis. The annual award is based on marketing, sales and service achievements.

Dealers honored were Gulf Shore Turf Supply, Inc., Pensacola, Fla.; Fallis Turf Equipment, Ltd., Richmond, British Columbia; Morin Equipment, Ltd., Ste Foy, Quebec; Duke Lawn Equipment, Ltd., Burlington, Ont.; Westward Power Equipment, Edmonton, Alberta. Cushman Motor Company, Inc., Minneapolis; Toro Pacific Distributing, Gardena, Calif.; Krigger & Company, Inc., Pittsburgh; and Tennessee Electric Motor Company, Nashville.

Dr. Fred V. Grau, president of the Musser International Turfgrass Foundation, presented a check to Dr. Harry Niemczyk of the Ohio Agricultural Research Center, at the recent GCSAA turf show in Minneapolis. The money will be used to help support a graduate student at Ohio State University. Ben Warren of Warren's Turf Nursery is treasurer of the foundation.



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Process Turns Cattle Manure To Odorless Soil Conditioner

A new process to improve the biological conversion of cattle manure into soil conditioner has been developed by the BioCon Division of Searle Agriculture Inc., Hereford, Texas. The product from the process is being introduced to the lawn and garden industry under the brand name "Tilleez". The soil conditioner is sold in bulk to golf courses and other quantity buyers.

Company officials told WEEDS TREES & TURF the conditioner improves the tilth and fertility of soil without creating the problems of odor, burning and weeds usually associated with manure. The conditioner is produced by a new plant in the Texas Panhandle which biologically converts manure from cattle feedlots into humus for garden and lawn use.

The process, developed after years of experimentation, eliminates offensive odor, even when the conditioner is wet. The process also dissipates the heat generated by decomposition and substantially reduces weed seeds and other harmful organisms, company officials said. Basically, manure from feedlots is pulverized and deposited in vats at the plant. In the vats, air is forced through the manure to stimulate digestion by aerobic bacteria.

Decomposition of the manure by aerobic bacteria is what makes the conditioner virtually odorless, dry or wet, according to Dr. William C. Hackett, division general manager. Aerobic bacteria — microorganisms that thrive in air — can digest manure without producing the odor that occurs when anaerobic bacteria — bacteria that live without air — perform the decomposition, Dr. Hackett said.

In less than a week, the composting — which would have taken nature a year to perform unaided — is completed in the vats, and the conditioner is ready for bagging. Elimination of offensive odor is only one of the advantages which the process imparts to the conditioner, company officials said. Heat generated during decomposition, which causes manure to burn vegetation, is dissipated from the conditioner in the vats. Exposure to that heat substantially reduces weed seeds and other harmful organisms in the manure before they can reach the soil.

R. Wayne Mezitt, vice president and general manager of Weston Nurseries, Inc., Hopkinton, Mass., will head the convention committee for the American Association of Nurserymen's 101st Annual Convention and Trade Show July 10-14 in Boston.

Wholesale Nursery Growers Choose Taylor as President

The Wholesale Nursery Growers of America recently held an election at its winter membership meeting in Arlington Heights, Ill.

Re-elected to serve for one-year terms were: Robert Taylor, Concord Nurseries, North Collins, N.Y., president; Hubert Nicholson, Commercial Nursery Co., Decherd, Tenn., vice president; Ben Davis II, Ozark Nurseries Co., Tahlequah, Okla., secretary-treasurer; and Bill Scarff, Scarff's Nursery, New Carlisle, Ohio, director-at-large.

Re-elected for two-year terms were Martin Usrey, Monrovia Nursery Co., Azusa, Calif.; Hans Hess, Hess' Nurseries, Cedarville, N. J.; Austin Kenyon, Greenleaf Nursery Co., Park Hill, Okla.; and Edward Porter, Triangle Nursery, McMinnville, Tenn.

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For ad on following page Circle 119 on free information card

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Salt May Seriously Damage Landscape Plants and Trees

When roads are icy, salt trucks can look very beautiful. But what deicing salt does to landscape plants is often not so pretty. Symptoms of salt injury to evergreens include drying and browning of needles. Dieback and witch's broom-like growth occurs on deciduous species like red oak, beech and crabapples.

"Some ornamental plants are more tolerant than others to flying salt spray or salt on the soil," Harold Davidson, extension horticulturalist at Michigan State University, told WEEDS TREES & TURF. "When you are choosing plants for locations near salted streets or highways, it is a good idea to choose those that are known to be salt tolerant."

Honey locust, Norway maple, blue spruce and Austrian pine are some of the best trees for areas where salt spray is a threat. Japanese maple, box elder, white spruce, red pine, white pine, Scotch pine and English yew are very susceptible to damage by salt spray. Oaks are also likely to be injured, Davidson said. Most shrubs are susceptible to salt injury, including most of the barberries, dogwoods, euonymus, honeysuckle, firethorn, elder, viburnum and coralberry. Most grasses, vines and ground covers, on the other hand, are at least moderately tolerant.

California Insect Expert Explains Elm Disease Control

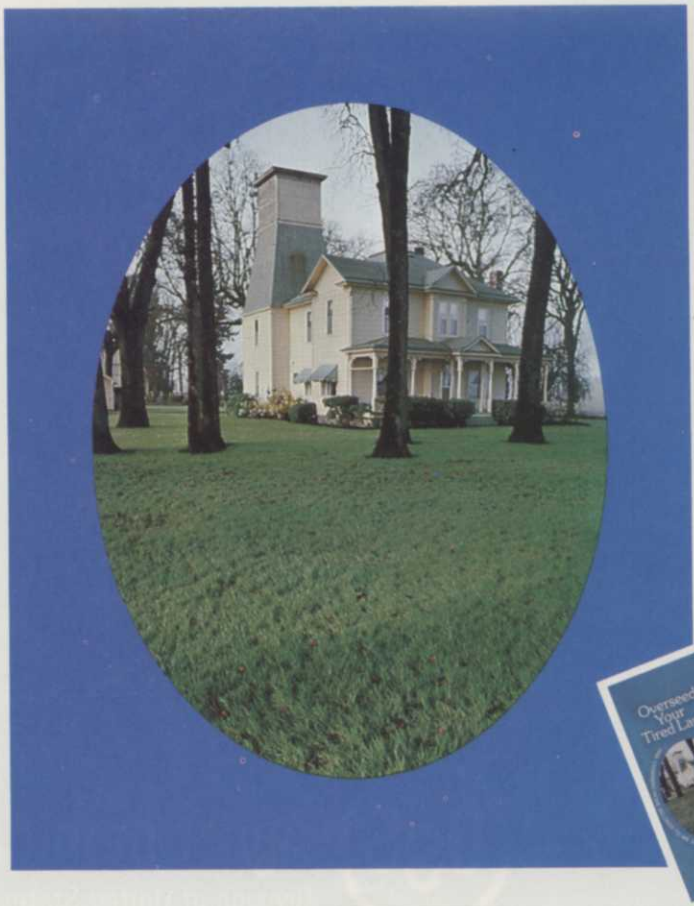
A University of California-Riverside professor of entomology and expert on tree insects says if your elm tree has been attacked by the elm bark beetle, you still can fight the insect if there is no disease.

First, water adequately. Trees suffering from drought are much more susceptible to beetle attack. Next there is chemical control: a methoxychlor spray. This is much less toxic than DDT to man and wildlife, he told WEEDS TREES & TURF.

"Look for general tree symptoms first," he said. "If the tree looks weak; if its leaves are not so green as they should be; if you find grass that looks like paprika in the cracks, crotches and around the base of the tree — you probably have the bark beetle. Then examine the bark; the brownish beetle makes holes one-eighth inch in diameter, or less; beetle larvae and pupae inside the bark are about the size and appearance of rice grains.

He said the beetle is most likely to strike by early April, with the peak in late April. A large second brood might appear in mid-June and peak in late July. A smaller third brood will peak in early September. Sprays should be applied in early April and mid-June.

If the elm bark beetle has already attacked in great numbers and infected the tree with Dutch elm disease, however, there is nothing to do but cut the tree down, bury or burn its parts and spray surrounding elms. "The problem is," he said, "people do not want to cut down trees because it is expensive. If they do cut the tree down, they do not want to burn the wood until winter. This is exactly the wrong thing to do, because this firewood lets the beetle emerge from the wood and carry the disease to other trees."



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Toro Holds Parts Seminars In Management for 23

Twenty-three persons were awarded certificates by the Toro Co., Minneapolis, Minn. at the completion of a training seminar in parts management and inventory control.

The sole woman attending was Gloria Reynolds, of Adams Equipment, Inc., Baltimore. Zaun Equipment, Inc., of Florida, sent three men, one from each of its branches: Carl Jeise, of Jacksonville; Dick MacDonald, of St. Petersburg; and Kevin Quinn, of Orlando. Minnesota Toro, Inc., had two representatives: Alex Donaldson, of Edina; and Rick Gwynn, of Crystal. Two Canadians in attendance were Alex Cormack, of Turf Care Products, Lt., Markham, Ontario; and Alain Forest, of Agri-Tech, Inc., Boucherville, Quebec.

New York State Arborists Elect Wickey as President

Richard Wickey, park supervisor for Garden City, N.Y. was elected president of the New York State Arborists Association at its recent annual meeting.

Three vice presidents were also elected: 1st vice president Jake Bruinooge, Bruinooge Tree Service, of Spring Valley, N.Y.; 2nd vice president Samuel Blakley of S. G. Blakley Tree Co., Mt. Vernon, N.Y.; 3rd vice president Leo G. Cook, Goodell Tree Service, of Vestal, N.Y.; James W. Taylor, James W. Taylor Tree Surgery of Walden, New York was reelected secretary-treasurer.

On the board of directors, past president Carl Lundborg of Bartlett Tree Experts, Westbury, N.Y. will serve a one-year term, as will Philip Brogan of Lewis Tree Service, Syracuse, N.Y. For two-year terms, Raymond Smith, Davey Tree Expert Co., of Buffalo, N.Y. and Jon Hickey, Parr & Hanson of Hicksville, N.Y. For three-year terms, Jack Flanagan, Tree Preservation Co. of White Plains and Robert Mullane, Landscape Foresters, Ltd. of White Plains, N.Y.

Margaret Herbst, with headquarters at 101 Park Avenue, New York, N.Y. 10017 was reappointed executive secretary.

Wickey has worked for the past 17 years as park supervisor in Garden City. Before this position, he served in the Nassau County Park Department for eight years. He has been active with the Association since 1958.
He is a graduate of the Long Island Agricultural and Technical Institute at Farmingdale.

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It can if it's certified Manhattan Perennial Ryegrass

Charles A. Sprague High School in Salem, Oregon was completed in 1972, including this fine athletic facility. Their choice of football turfgrass was Manhattan "Turf type" Perennial Ryegrass. Manhattan quickly established a lush green turf, evident in the above photograph.

With proper maintenance, Manhattan has held up well through three of Oregon's rainy fall seasons and has retained its rich appearance and all-weather playability. For more information on Manhattan and the Sprague High School football field story, write to us at the address below.

Manhattan is a Natural.

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Sprinkler Irrigation Group Publishes License Guideline

The Sprinkler Irrigation Association has announced the publication of its *Landscape Irrigation State Licensing Guideline.* Developed by the SIA's landscape irrigation committee, the guideline is a study of the need for state licensing programs, the formulation methods of actual legislation, an evaluation of existing legislation and its specific application to the industry, consideration of the licensing of landscape irrigation consultants and an outline of methods of obtaining industry support and informing the public and legislatures of needs for the legislation.

The Guideline is available from the SIA office at 13975 Connecticut Avenue, Silver Spring, Maryland 20906 at a cost of $4.00 per copy. The 72-page booklet contains the following sections:

Introduction, terminology, statement of need, protection of potable water supply, protection from the public from injury or damage, protection of consumer interests, protection from financial liability, conservation of power and water, guidelines for the development of a state licensing law with model legislation and notes and commentary and a summary.

The basic portion of the guideline, the model licensing law, is presented in a format that is both useful and easy to understand. The actual suggested wording of legislation is contained on the left hand pages with explanatory notes and comments as to its implications and necessity, along with room for personal notes, on the right hand page.

As a guideline, all possible material pertaining to a state licensing program has been included. All points presented are actually a part of licensing laws in effect in at least one state at the time of preparation. Even though selective deletions may be required in a given state to meet specific local requirements, an effective licensing law may be formulated from the guideline if sufficient material is judiciously incorporated to serve the needs of any given state.

Extensive review of the material was made to insure that it included the most up-to-date information available form states having existing licensing laws, answered problem areas as they might have developed in these states and also met basic legal requirements as well as appropriate governmental regulations.

The guideline, which has been three years in the development, was reviewed by Leo B. Hoschler, registrar of contractors for California; John Kayetan, state registrar of contractors for Arizona; John Heidman, member of the Texas State Board of Landscape Architects; F. J. MacDonald, executive vice president of the American Institute of Landscape Architects; and Malcolm D. MacArthur of the firm of Lee, Toomey and Kent, legal counsel to the SIA.

Earle H. O'Dell (left) of Chesapeake, Va., and Houston B. Couch of Blacksburg, Va., were honored at the 16th annual Virginia Turfgrass Conference held recently in Fredricksburg. O'Dell, secretary-treasurer since 1969 of the Virginia Turfgrass Council, received the R. D. Cake award honoring the council's first secretary-treasurer and Couch received the Tolly H. Quinn service to industry award. O'Dell, praised for his role as secretary-treasurer, is assistant manager of the turf and garden division of Todd Co., Chesapeake. Couch, a professor of plant pathology at Virginia Tech in Blacksburg, was cited for his work with turf diseases.

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CROSS-LAMINATED POLY SHEETING

it ensures the QUALITY of the system!

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Why is TU-TUF Cross-Laminated Recommended over Regular Poly?

Because PERFORMANCE is what counts, and Golf Superintendents have much more at stake than the small cost difference between low density poly film and **TU-TUF** Cross Laminated barrier sheeting.

- Standard Poly cracks in folds and creases . . . *TU-TUF does not.*
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- Regular Standard Poly has virtually no snag or puncture resistance . . . *TU-TUF has outstanding resistance to both.*
- Standard Poly shows early disintegration under weather conditions . . . *TU-TUF is long lasting, weather stabilized.*
- Regular Standard Poly has only a fair water-vapor transmission rate . . . *TU-TUF is up to 10 times better.*
- Regular Standard Poly is limited in widths and length . . . *TU-TUF is made to prescribed size, thus eliminating waste and cutting down labor costs.*

Without question, the Barrier sheeting to be used is the very heart of a successful PURR-WICK installation. Don't take chances with an inferior poly film...get the recommended barrier material...**TU-TUF** Cross Laminated.

From "UNPLAYABLE" TO PLAYABLE LIES

Looking down the perennially water soaked unplayable fairway at Battle Creek Country Club, work has begun to eliminate a condition that has plagued members for years. The 300,000 sq. ft. area employed **TU-TUF** Cross-Laminated barrier material.

TU-TUF being unrolled down the fairway from a golf cart. Lengths and widths are available to order.

Tu-TUF also ideal for Weed Control, Ice Skating Rinks, Equipment Covers, Temporary Enclosures.

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Volume on Street Trees Published by Penn State

Street trees, used properly in an urban environment, provide lasting benefits to man. But, a tree planting plan in which details are ignored — either in the development or actual establishment — usually ends in disaster.

The Pennsylvania State University's College of Agriculture has published a book, *Street Trees,* designed to assist those who take part in planning and carrying out tree beautification programs in urban areas.

"This book has been prepared for use by shade tree commissions and professional horticultural firms who plan and carry out tree planting and maintenance," said Dr. Roland R. Daniels, Penn State assistant professor of environmental horticulture and author of the publication.

Topics include site selection, variety selection, site preparation, planting, and care and maintenance following planting. Included in an appendix are a checklist of current street plantings and analysis of potential planting sites; proposed specifications for selecting, planting, and maintenance of street trees within developments; general specifications for deciduous shade and flowering trees; standards of workmanship for tree care and maintenance; and suggested contract specifications for establishment and maintenance of street plantings.

Two other features are a tree hardiness zone map of Pennsylvania and an outline of characteristics of all trees suitable for planting in the state. The book may be purchased for $2.00 plus six percent Pennsylvania sales tax. Make check or money order payable to The Pennsylvania State University and send with your name and address to STREET TREES, Box 6000, University Park, Pa. 16802.

Newly elected officers of the Midwest Regional Turf Foundation are from left, Danny Quast, Milwaukee Country Club, president; Dr. W. H. Daniel, Purdue turf specialist, re-elected as executive secretary; and Kermit D. Delk, Springfield Country Club, Ohio, vice president. Over 700 attended the Foundation's conference last month at Purdue.

Frank's Nursery Sales Inc. Expects To Boost Sales 15%

Frank's Nursery Sales Inc. said it expects 1976 sales to be about $60 million, up 15 percent from $52.3 million last year.

The increased revenue will come from 62 stores it will have operating at year-end, compared with 54 units a year earlier, the company said. During the year, Frank's said, it plans to open 11 stores, including two garden centers it is acquiring from Anderson's in Columbus, Ohio.

Sales Up 50% Last Year, Echo Chain Saw Reports

The Echo Chain Saw Division, Kioritz Corp. of America, Northbrook, Ill., has announced sales for the 1975 fiscal year were up over 50 percent in a recent statement by Donald A. Bartelt, director of marketing.

"While the chain saw industry, in general, was off approximately six percent during the past 12 months, our sales were up dramatically for the third consecutive year since the Kioritz Corporation of America was established," he said.

Improved Quarter Margins Reported by Toro Company

Toro Company, Minneapolis, has reported sales of $35.8 million and earnings of $751,000 for the second fiscal quarter ended Jan. 31. Sales for the similar period of the preceding year were $37.4 million and earnings $849,000.

Sales for the first six months ended Jan. 31 were $56.8 million, a decrease of 13.4 percent from the $64.4 million registered for the same period of the preceding fiscal year. Net earnings for the first half were $98,000, compared with $941,000 in the first half of fiscal 1975.

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For ad on following page Circle 102 on free information card

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Straight 31-0-0 Par Ex IBDU gives you a really slow release of N, plus benefits you don't get from ordinary slow release nitrogens; namely, total availability in a single growing season, earlier green-up in spring and longer lasting green in fall.

Par Ex fertilizer mixes with IBDU are uniformly made to give you the correct balance of water soluble nitrogen, water insoluble nitrogen, phosphorus and potassium for your specific turfgrass needs.

So order Par Ex Professional Products. The only brand that offers IBDU . . . mixed or straight.

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WTT-4

Crownvetch—Seed or Plants?

Until 1946, no seed or crownvetch was commercially available. Plantings had to be done slowly and laboriously and expensively with crowns, according to well-known agronomist Dr. Fred V. Grau.

When Grasslyn, Inc. brought forth hulled, scarified seed of crownvetch in 1946, it amounted to a revolution in establishing erosion-control groundcover on slopes. For the first time, this ground-hugging legume could be established by the low-cost method of seeding, Dr. Grau told WEEDS TREES & TURF.

Until the advent of Penngift crownvetch seed, Pennsylvania had specified rooted plants of honeysuckle. Now virtually all of the crownvetch established on the slopes of the thousands of miles of highways is done by hydroseeding. This is a process that was pioneered in 1939 by Dr. Grau and the late C. N. (Doc) Keyser on the first section of the Pennsylvania Turnpike. It consists of a water slurry of seed, limestone, fertilizer and other ingredients. The slurry is sprayed on a rough slope and mulched with straw, wood cellulose fiber or various kinds of nets. Planting of plants or crowns continued for a time because old habits are hard to break. Soon the economics of seeding on raw subsoil slopes dictated the demise of the slow, expensive plant-planting method, Dr. Grau said. Ironically, Grassyln was the only firm producing both crowns and seed, but consistently their management recommended seed, even though the sale of plants would have been more to their advantage financially. "But don't you get coverage faster from plants?" some ask. The answer is no, Dr. Grau said. A crown or potted plant may take four to eight weeks to get rooted down and to start spreading. The bare soil between the plants meanwhile is subject to erosion. A recent hydroseeding job in New York State was done in late June. Specifications were prepared by Dr. Grau. Two months later, when he saw the slope, there was 100 percent cover of crownvetch and companion grass. The legume was six to eight inches tall and appeared to be six to eight months old.

He said specifications writers would do well to seek the source of accurate information before putting a spec out to bid. The first consideration is "no topsoil." Next come adequate lime and the correct analysis of fertilizer. Third, and of extreme importance, is excess inoculant. Fourth is adequate mulch and the right kind for the circumstances.

New Rain Bird Distributor In West Is Polson Company

Rain Bird Sprinkler Manufacturing Corp., Glendora, Calif. has appointed Polson Company as its new franchised turf distributor for the state of Washington and parts of Idaho and Montana.

Polson manager John Bangert said his company's new irrigation facility in Seattle, Wash. is now opened and handles all of the contractor's needs.

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John Van Dam (center), University of California cooperative extension farm advisor, accepts a $2,000 check from Alan M. Dennis (left), president of the Southern California Turfgrass Council to help sustain ongoing turf research at the University's South Coast Field Station in Santa Ana. Charles F. Rei (right) is chairman of the Council's turfgrass research fund.

The Davis Difference.

The Fleetline 14+4 fits convenience and performance into snug digging sites and tight budgets.

Take the struggle out of installing sprinkler systems, CATV cable and other small but strenuous trenching jobs.

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Headquarters Sales Group Created by Scott's ProTurf

Jack Cantu, O. M. Scott & Sons vice president and general manager of the Pro-Turf Division, Marysville, Ohio, recently announced the formation of a special department to provide products and services from Scott headquarters directly to company lawn, school and cemetery turf managers, as well as to commercial lawn applicators and landscapers.

John Dunham and Jim George will jointly head the department. Dunham has a strong technical turf background with experience in the lawn applicator industry, while George is a former ProTurf sod market technical representative.

Cantu made it clear that the headquarters sales group will limit its activities to direct sales to specified portions of the professional turf market. Golf course superintendents, sod growers and commercial nurserymen will continue to be served through ProTurf's coast-to-coast network of 67 tech reps.

Turf research at Penn State has been supported by $9,000 from members of the Penn State Turfgrass Alumni Club over the past four years. Club president Gerald Brennemen of the Longvue Country Club, Pittsburgh, second from left, presented a check for research to the faculty at Penn State during the annual turfgrass conference held recently at University Park, Pa. Faculty shown are Dr. J. M. Duich, left, Dr. D. V. Waddington, receiving grant, and Dr. T. L. Watschke, right.

Johns-Manville Plans Center In New Jersey for Service

Johns-Manville's Ag-Turf Division has announced plans to establish a service facility in northern New Jersey to serve the eastern irrigation market, according to William J. Christman, division general manager.

The new center, which the company expects to have in operation during the first half of this year, will serve as a physical distribution point for the company's complete line of sprinkler products. Johns-Manville, whose sprinkler manufacturing facilities are located in Fresno, Calif., is opening the center in view of the importance of the eastern market.

"The new service center, in conjunction with our new California brass foundry, should enable us to give better service to the irrigation market on the East Coast than any of our competitors," Christman said. "We recognize the importance of this market, and that is why we are gearing up to do something about it," he said.

A new Johns-Manville red brass foundry, located in Fresno, went on-stream last month. Utilizing electric furnaces, the automated facility will be devoted to the production of sprinklers and accessories. Anticipated production runs will average 500 molds an hour. The foundry cost almost $10 million.

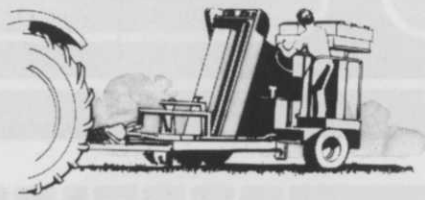
Diamond Shamrock Exec Says Growth To Continue

Diamond Shamrock Corporation Chairman, C. A. Cash told thee Cleveland Society of Security Analysts recently he expects 1976 results to exceed 1975, when the company recorded net income of $114 million on sales of $1.1 billion. However, he noted that, "While we cannot expect to maintain the kind of percentage growth rates we have achieved in the last two years, we do expect to achieve a continuous record of earnings growth."

Reviewing the diversified chemicals and oil and gas company's performance, he noted that since 1970: return on sales doubled to 10% in 1975; return on equity increased to 26% last year; and return on capital employed rose to 15%.

In the new Biosciences and Metals Unit, Cash said the company will have doubled its production capacity for its proprietary fungicides in time for 1978. He attributed the rapid growth of the agricultural chemicals business to research successes such as Daconil and Bravo fungicides and Dacthal herbicide.

The "Tow-Boy"
SOD HARVESTER



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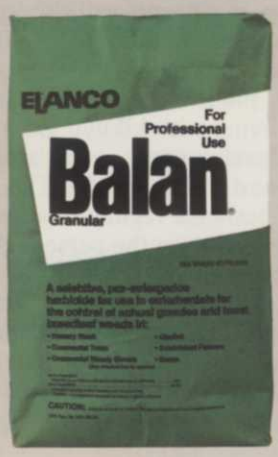

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Davey Lawnscape Division Expands Service in Ohio

Davey Lawnscape Service, the lawn care division of Davey Tree Expert Co., Kent, Ohio, has opened two new offices and warehouse facilities to provide expanded service in northeastern Ohio.

Davey's new lawn care service was introduced last year to homeowners and commercial establishments in Portage and Summit counties. In view of the public's initial response and acceptance of the program and demand from adjacent counties, Davey Lawnscape Division is expanding to provide service in Cuyahoga and Stark counties this year.

The service — a professionally applied, full season lawn fertilization, insect and weed control program — was specially designed to fit the grasses and seasonal growth patterns in northeastern Ohio, according to J. Martin Erbaugh, lawnscape general manager.

"Davey Lawnscape Service is four separate, balanced formula, liquid chemical applications which provide the right nutrients, herbicides and insect control ingredients at properly timed intervals to feed lawns and control common weeds and insects," Mr. Erbaugh told WEEDS TREES & TURF.

"The service is provided at a price competitive with what the homeowner or businessman would spend for materials on a do-it-yourself basis, and we will care for all, or just a portion, of the property," added Mr. Erbaugh. "With our service, time is saved, proper application at the right time is assured, and most important, it is done by trained professionals."

Each technician, a graduate of the Davey Institute of Lawn Sciences, operates a spray vehicle equipped with a specially designed applicator. The applicator is designed to assure uniform coverage while minimizing overspray, "drift" and unsightly streaking.

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One man with a Billy Goat becomes a big clean-up crew. BG 60 is available in self-propelled and push models, with gasoline or propane engine, or batteries. For all models—optional intake hose for hard to reach areas.

Model	HP	Snout width	Blower housing	Application
BG 60	8	30"	Steel	Industrial
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KD35	3½	26"	Steel	Lawns, drives

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Superintendents, Sod Farms Aid California Turf Study

The golf Course Superintendents Association of Southern California and Pacific Sod Farms have made donations to the turfgrass research fund of the Southern California Turfgrass Council. The superintendents donated $700 and Pacific $500.

Program Outlines Completed For California Turf Institute

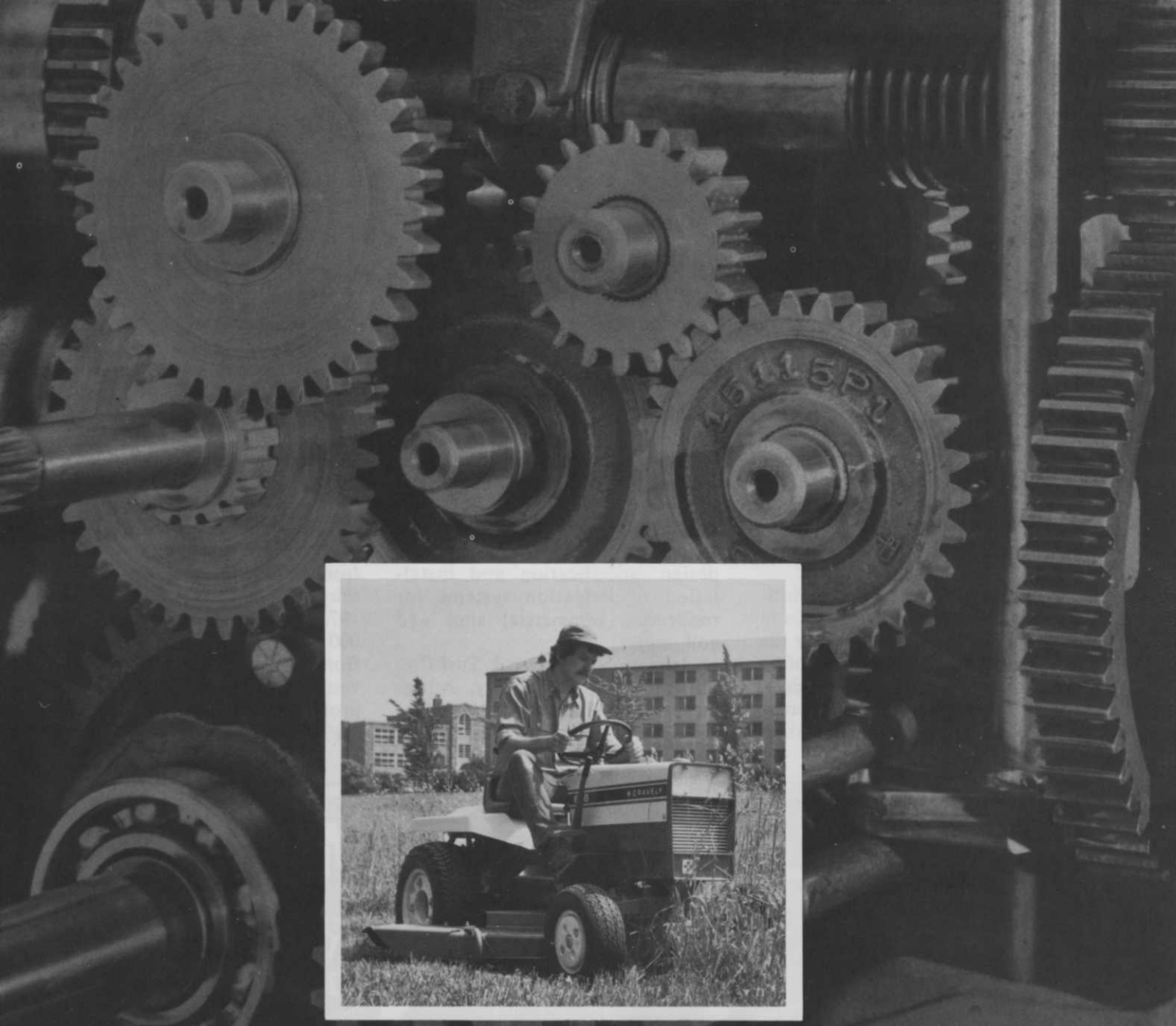
Program outlines for the 1976 Southern California Turf & Landscape Institute, to be held April 28 and 29 at the Royal Inn, Anaheim, have been completed, reports John Van Dam, co-chairman of the educational event which attracted nearly 700 registrants last year.

Sharing sponsorship of the Institute are the University of California Cooperative Extension and the Southern California Turfgrass Council. Co-chairman with Van Dam is Alan Dennis, Council president. Van Dam is a UCCE turfgrass specialist.

According to program coordinator Victor A. Gibeault, extension horticulturist, joint sessions will be held Wednesday morning and Thursday afternoon. Among the topics slated for review are how grasses grow, drought tolerant varieties, pest activity, sodding practices and climaxed with a closing panel discussion Thursday afternoon that will consider problems and solutions associated with intensely used turfgrass areas.

With split sessions scheduled Wednesday afternoon and Thursday morning, registrants will choose between subjects related to plant management or personnel management. One plant session will be devoted to living with kikuyu grass. Employee development, visual aids in training and updating of CETA, OSHA and pesticide regulations are to be feature topics in the personnel management segment.

Among the noted speakers for the 1976 Institute are Drs. James Beard, Texas A & M University; Jack Butler, Colorado State University; and A. L. Turgeon, University of Illinois.



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Toro Names Michigan Man Regional Contractor of Year

Bern Flier, president of Flier's Underground Sprinkling, Grand Rapids, Mich., has been named Upper Midwest "Contractor of the Year" by Toro Co., Minneapolis.

Control of Mole Crickets In Bahiagrass Explained

Mole crickets can create real problems for bahiagrass, according to the Florida Nurserymen and Growers Association. These insects become very active in late March and early April. The female emerges from the ground, she begins to fly hunting for the male and then they mate.

Control of mole crickets is difficult while the breeding season is in progress. As soon as this is over the female may then bury into the soil to deposit eggs. If a soil insecticide is applied, residual in the soil, there is a chance much of the population will be eliminated. Bahiagrass should be watched for signs of mole cricket runs, the soil will be soft and spongy. In bare areas the runs may be seen.

Two New Turf Distributors Are Appointed by Rain Bird

Rain Bird Sprinkler Mfg. Co., Glendora, Calif. has appointed two new franchised turf distributors.

Western Industrial Supply, Amarillo, Texas, will serve the Panhandle Texas market area. Ernest Oakley, president of Western, said it will stock the full line of Rain Bird turf irrigation equipment as well as other related equipment. It will also have capabilities in assisting with design, specification and installation of irrigation systems for residences, commercial sites and golf courses.

Irrigation Sprinkler & Turf Co., Division of Perry Supply, Alburquerque, N.M., will serve New Mexico. Paul Clendenin, president of Irrigation, said it will carry the complete Rain Bird turf line and other related products. The company said it has broad experience in the turf care field.

International Harvester Co. Profit Slump in 1st Quarter

International Harvester Co., Chicago, said its earnings fell 54 percent in its first fiscal quarter. The company reported profit of $29.9 million, down from a record $65.2 million in the year-earlier period. Sales in the period ending Jan. 31 fell slightly to $1.08 billion from $1.09 billion the year before.

The company said, however, that its first quarter net rose sharply from the "depressed" levels of the third and fourth quarters of fiscal 1975, when Harvester earned $720,000 and $1.5 million, respectively, from continuing operations. Harvester also said its first quarter profit was the second best ever for the period.

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Rates: All classifications 50¢ per word. Box number, $1. All classified ads must be received by Publisher the 10th of the month preceding publication date and be accompanied by cash or money order covering full payment. Mail ad copy to: Dorothy Lowe, Weeds, Trees & Turf, P.O. Box 6951, Cleveland, Ohio 44101.

USED EQUIPMENT

FOR SALE: 2 used aerial baskets — 50 ft. working height, 2 Asplundh brush chippers. Bean sprayer, 35 G.P.M. Vermeer stump cutter 1560. Parkway Tree Service, Milwaukee, Wisconsin. Phone 414 257-1555.

ASPLUNDH 1971 model L-31 bucket truck mounted on 1971 Chev. carrier powered by 6 cylinder gas engine, equipped with utility body, excellent running operating condition, $7,500.00. Vilsmeier Equipment Inc., Rt. 309, Montgomeryville, Pa. 18936. Phone 215 699-3533.

FOR SALE: 52 ft. Skyworker, 85 ft. Arlo crane, Vermeer tree spaces, late model Hydro-Ax's, other used equipment. Please contact Jeff Gould, P.C. Gould Sales Col., Box 178, Essex, Connecticut 06426. 203 767-1636.

1969 VERMEER TSS44 tree spade mounted on 1968 Dodge flat bed 300 truck, excellent condition. Used on private estate and professionally maintained. Asking $7,000. Rasco, Box 193, Lakeville, Conn. 06039. Phone 203 435-2565.

FOR SALE: 11 gang Jacobsen Blitzer gang mowers, steel wheels; sharpened and overhauled, $2000.00, will deliver. Schneider Turf Farm, R9, Quincy, Illinois 62301. Phone 217 224-1893.

BEAN 300 series mist blower. Needs fan but otherwise in excellent condition, $2,5000.00. McGinty Bros., Inc., Long Grove, Illinois. 312 438-5161.

1975 MODEL 500 HYDRO axe, brand new, less than 150 hours, has all extra features including air conditioning, over $44,500.00. Call 914 895-3495.

PRINCETON HARVESTER, excellent condition. $10,000., Maryland Turfgrass Industries, Inc., Box 119, Newark, Delaware 19711. Phone 301 398-6262.

VERMEER TS-66T on Ford tandem truck with 6000 miles. Hardly used, mint condition. Call 517 655-1244.

301 T — ROTOMIST TREE SPRAYER, excellent, 300 hours, guaranteed. Box 150, c/o Weeds, Trees & Turf, Box 6951, Cleveland, Ohio 44101.

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SOD QUALITY Seeds Merion, Fylking, Delta, Park, Newport, Nugget, Adelphi, Cheri, Glade and Baron bluegrasses also fine fescues. Manhattan rye grass. Custom mixing available. Michigan State Seed Co., Grand Ledge, Michigan 48837. Phone 517 627-2164.

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1973 MITTS & MERRILL Brush Chipper Model M-7, mint condition, extra set of blades. Used on private estate and professionally maintained. Asking $3800. Rasco, Box 193, Lakeville, Conn. 06039. Phone 203 435-2565.

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Trimmings

Since 1937, the town of Ridgewood, N.J. has been applying an old-time remedy for ridding sewer lines of tree roots. The town distributes quarter-inch crystals of copper sulphate which they turn over to house owners in quart-size cardbard containers holding slightly less than two pounds of material.

Instructions call for crystals to be poured into porcelain toilet bowls which are connected by a lead bend to the soil pipe (never into sink which has a thin-walled trap). Flushing and agitating with a plunger makes sure all crystals are carried down the drain and assures no damage or stain to the porcelain.

Twice-a-year treatments give excellent control of roots in tile sewer connections and there is no evident injury to trees or plants whose roots are killed. Back in 1961, the township discontinued the program for one year and found the cost of maintaining sewer lines rose 40 percent. They continued the program, it was reported in a recent newsletter of the American Horticultural Society and excerpted in the *Journal of Arboriculture.*

The Irrigation Division of Toro Company has published a 175-page design manual entitled *Residential and Commercial Turf Irrigation Systems Information.*

Intended for use by architects, landscape architects, contractors and other specialists involved in the designed installation of automatic underground sprinkling systems, the manual is a companion publication to *Design Information for Large Turf Irrigation Systems* published in 1972.

The book is available from Toro Irrigation distributors or directly from Order Desk, Irrigation Division, The Toro Company, P.O. Box 489, Riverside, Calif., 92502 for $6.75, postage prepaid.

Union Carbide Corp. has published a free 30-page bulletin describing nematode damage and how to control it with chemicals.

The bulletin is entitled *Nematodes and Their Control* and can be obtained by writing the company at P.O. Box 1906, Salinas, Calif., 93901.

Increasing pressures to conserve energy will lead to widespread use of sewage water for irrigation and fertilization, according to James W. Adams, vice president and general manager of the Irrigation Group of Toro Company, Bloomington, Minn.

He said golf courses will be among the first to make extensive use of recycled sewage water but the practice will spread to all types of turf and vegetation management, including agriculture.

"The advantages of on-land disposal of sewage water have been well known for years," he told WEEDS, TREES & TURF. "But interest in on-land disposal systems is now accelerating because of the combined effects of water shortages and the energy crisis." The latter, he said, has increased costs for pumping water and for fertilizers derived from oil and natural gas.

With state and federal laws now requiring sewage water disposed into lakes or streams be virtually pure, alternative systems for disposal are becoming more attractive, he said. "And when you consider that the principal pollutants in sewage water are nitrogen and phosphorus — which all plants must have in order to grow — it doesn't make sense to be wasting both water and nutrients, as well as the energy to dispose of them, when it isn't necessary," he said.

To people, the brilliantly colored dying leaves in autumn are a source of beauty, but to the tree they mean survival, says Dr. Patricia W. Spencer, University of Illinois horticulturist. Shortly after a leaf begins to lose its chlorophyll (in autumn) it also begins to lose the ability to retain water and remain turgid, she reported in a recent newsletter of the American Horticultural Society.

The membranes surrounding each cell become leaky and no longer act as semi-permeable barriers to solutes in the cell sap. Cellular fluids ooze out of the cells and flood the intercellular spaces, rendering the leaf translucent, like cooked celery or spinach. This state of affairs does not last long, for the water soon evaporates, leaving the leaf drooping, dry and shriveled. The now-desiccated brown leaf falls from the tree and becomes matted into the ground below.

As autumn rains and winter snows percolate through the matted, fallen leaves, they remove traces of minerals, especially calcium, and return them to the soil, where soil bacteria and fungi feed upon them. The leafy skeletons of cellulose that remain on the surface act as a mulch, holding in soil water and modulating soil temperatures.

By the times the visible signs of this aging appear, the leaf has already undergone a series of events that will lead to its eventual death and the tree's survival. Before it finally falls from the tree, dry and brown, the leaf will have returned more than half of its nitrogen, phosphorous and potassium to the permanent tissues of the tree, plus some magnesium, sulfur and manganese. Calcium, which is not easily removed, is the only mineral element remaining to any degree.

Even evergreens, which remain green and retain their chlorophyll-filled foliage throughout the winter, eventually shed their old leafy growth and undergo a similar reclamation of mineral elements. This reclamation of mineral elements from dying tree leaves, along with concurrent removal of carbohydrates, is not merely an illustration of natural conservation; it is a process absolutely essential to future growth, she said. The report was excerpted in the *Journal of Arboriculture.*

The American Society of Landscape Architects Foundation recently published Award Winning Landscape Architecture.

Winning entries in the ASLA Professional Awards Program, for the years 1970 through 1974 have been depicted in photos; drawings have been reproduced; and the comments of the award juries are presented. For information write: ASLA Foundation, 1750 Old Meadow Rd., McLean, VA 22101.

Here's the new riding mower that thinks it's a walking mower.

Like all of us Jacobsen Distributors, you'll find Earl Cain (of Lawn & Garden Supply Co., Phoenix, Arizona) eager to tell you about Jacobsen's new 70" Triplex mower.

We're all pretty excited about this brand new mower that mows and trims areas like they were done by hand.

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The mowers are fully articulated to follow the contours of uneven ground. And the constant-speed reels give any turf a finish a barber could be proud of.

There's a technically advanced hydrostatic drive, with both forward and reverse, that produces over 7 MPH in transport speed, and up to 4 MPH in mowing speed.

Ask your nearby Jacobsen Distributor about the new 70" Triplex mower. When it comes to mowing and trimming turf areas, it sure beats walking.

Your Jacobsen Distributors.

Great products deserve great service.

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Pick baron because it meets all your needs.

When comparing bluegrass varieties, a good rule of thumb is. . .**pick the most versatile bluegrass you can buy.** Naturally you want a grass that has a deep rich color, a grass that has high disease resistance and one that blends well. You expect that. But you may need more from your bluegrass.

1. If your need is for a bluegrass that can stand low temperatures. . .Baron endured -40°C temperatures in University of Minnesota cold hardiness studies. It is recommended for every cold climate state in the U.S. Or, if your need is for a bluegrass that tolerates extremely warm weather. . .in University of Maryland and Virginia Polytechnic Institute and State University studies, Baron ranked among the top for endurance to hot and humid summer stress conditions.

2. If *Poa annua* is a problem, you'll certainly want to look at Baron. . . University of Illinois studies ranked Baron in one of the top three bluegrass categories for competition against *Poa annua* and other unwanted grasses.

3. Wear tolerance studies conducted by Dr. James Beard, formerly of Michigan State University, ranked Baron third among 18 leading bluegrass cultivars tested.

4. If you are a sod farmer, you need a quick stand and good sod strength. . . Michigan State University studies placed Baron in the best group for rapid sod development and superior sod strength.

5. If you need to cut Baron Kentucky Bluegrass as low as ¾" all summer long, go ahead! Baron's low growing blades bend down to a low angle escaping the mower blade. . .leaving more foliage for a healthier green plant.

6. A bluegrass requiring less fertilizer is always welcome. Baron consistently outperforms other bluegrasses in low fertility trials as documented by Michigan State University. Just three pounds of nitrogen per 1000 square feet applied annually in a balanced fertilizer. Substantially better than Merion and other high fertility requiring varieties.

7. When you need your supply of Baron, you'll find it's practically just around the corner. Baron is stocked by leading seed houses and distributors located throughout the U.S. and Canada.

8. And the price is right. Compare prices of other top bluegrass varieties and you'll be pleased with Baron's price.

Pick a bluegrass that meets **all your** needs. You'll pick versatile, durable, and reliable Baron Kentucky Bluegrass. Baron is only available as certified seed.

LOFTS

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*U.S. Plant Patent #3186, Dwarf Variety

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